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*D. Meade*

*University of Maryland*

# THE GRADUATE SCHOOL

38

OFFICIAL PUBLICATION

No. 1



*Announcements*

1941 - 1942

COLLEGE PARK, MARYLAND  
JANUARY, 1941



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*University of Maryland*

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*Announcements*

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# CALENDAR

1941 - 1942

## FIRST SEMESTER

1941

Sept. 17-20	Wednesday-Saturday	Registration.
Sept. 22	Monday, 8:20 a. m.	Instruction for first semester begins.
Sept. 24	Wednesday	Modern language examinations for Ph.D. requirement.
Oct. 1	Wednesday	Last day to file applications for admission to candidacy for Doctor's degree at Commencement of 1942.
Nov. 19	Wednesday, 5:10 p. m.	Thanksgiving recess begins.
Nov. 24	Monday, 8:20 a. m.	Thanksgiving recess ends.
Dec. 19	Friday, 5:10 p. m.	Christmas recess begins.

1942

Jan. 5	Monday, 8:20 a. m.	Christmas recess ends.
Jan. 22-29	Thursday-Thursday	First semester examinations.

## SECOND SEMESTER

Feb. 2-4	Monday-Wednesday	Registration for second semester.
Feb. 4	Wednesday	Modern language examinations for Ph.D. requirement.
Feb. 5	Thursday, 8:20 a. m.	Instruction for second semester begins. Last day to file applications for admission to candidacy for the Master's degree at Commencement of 1942.
Feb. 23	Monday	Washington's Birthday holiday.
April 2	Thursday, 5:10 p. m.	Easter recess begins.
April 8	Wednesday, 8:20 a. m.	Easter recess ends.
May 16	Saturday	Last day to deposit Doctor's thesis in office of Graduate School.
May 23	Saturday	Last day to deposit Master's thesis in office of Graduate School.
May 26- June 3	Tuesday-Wednesday	Second semester examinations.
May 30	Saturday	Memorial Day holiday.
May 31	Sunday, 11:00 a. m.	Baccalaureate sermon.
June 3	Wednesday	Modern language examinations for Ph.D. requirement.
June 5	Friday	Class Day.
June 6	Saturday	Commencement.

## SUMMER SESSION

June 22	Monday	Summer session begins.
July 31	Friday	Summer session ends.

## BOARD OF REGENTS

	TERM EXPIRES
W. W. SKINNER, Chairman.....	1945
Kensington, Montgomery County	
HENRY HOLZAPFEL, JR., Vice-Chairman .....	1943
Hagerstown, Washington County	
MRS. JOHN L. WHITEHURST, Secretary .....	1947
4101 Greenway, Baltimore	
J. MILTON PATTERSON, Treasurer .....	1944
1015 Argonne Drive, Northwood, Baltimore	
ROWLAND K. ADAMS .....	1948
1808 Fairbank Road, Baltimore	
W. CALVIN CHESNUT .....	1942
Roland Park, Baltimore	
WILLIAM P. COLE, JR. ....	1949
Towson, Baltimore County	
HARRY H. NUTTLE .....	1941
Denton, Caroline County	
JOHN E. SEMMES .....	1942
100 W. University Parkway, Baltimore	

## ADMINISTRATIVE OFFICERS

H. C. BYRD, LL.D., President of the University.  
C. O. APPLEMAN, Ph.D., Dean of the Graduate School.  
ELSIE PARRETT, M. A., Secretary to the Dean.  
HAROLD BENJAMIN, Ph.D., Director of the Summer School.  
ADELE STAMP, M. A., Dean of Women.  
H. T. CASBARIAN, B. C. S., C. P. A., Comptroller.  
EDGAR F. LONG, Acting Director of Admissions.  
ALMA H. PREINKERT, M. A., Registrar.  
CARL W. E. HINTZ, A. M. L. S., Librarian.  
H. L. CRISP, M. M. E., Superintendent of Buildings and Grounds.  
T. A. HUTTON, B.A., Purchasing Agent and Manager of Students'  
Supply Store.

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## THE GRADUATE SCHOOL COUNCIL

H. C. BYRD, LL.D., President of the University.  
C. O. APPLEMAN, Ph.D., Dean of the Graduate School, Chairman.  
HAROLD BENJAMIN, Ph.D., Professor of Education.  
L. B. BROUGHTON, Ph.D., Professor of Chemistry.  
R. B. CORBETT, Ph.D., Director Experiment Station.  
E. N. CORY, Ph.D., Professor of Entomology.  
H. F. COTTERMAN, Ph.D., Professor of Agricultural Education.  
C. B. HALE, Ph.D., Professor of English.  
L. V. HOWARD, Ph.D., Professor of Political Science.  
WILBERT J. HUFF, Ph.D., D.Sc., Professor of Chemical Engineering.  
L. H. JAMES, Ph.D., Professor of Bacteriology.  
JOHN G. JENKINS, Ph.D., Professor of Psychology.  
DEVÖE MEADE, Ph.D., Professor of Animal and Dairy Husbandry.  
M. MARIE MOUNT, M. A., Professor of Home and Institution Management.  
H. J. PATTERSON, D.Sc., Dean Emeritus of Agriculture.  
W. MACKENZIE STEVENS, Ph.D., Professor of Economics and Business  
Administration.  
T. H. TALIAFERRO, C. E., Ph.D., Professor of Mathematics.  
A. E. ZUCKER, Ph.D., Professor of Modern Languages.  
WALTER H. HARTUNG, Ph.D., Professor of Pharmaceutical Chemistry  
(Baltimore).  
EDUARD UHLENHUTH, Ph.D., Professor of Gross Anatomy (Baltimore).

## GENERAL INFORMATION

### HISTORY AND ORGANIZATION

In the earlier years of the institution the Master's degree was frequently conferred, but the work of the graduate students was in charge of the departments concerned, under the supervision of the general faculty. The Graduate School of the University of Maryland was established in 1918, and organized graduate instruction leading to both the Master's and the Doctor's degree was undertaken. The faculty of the Graduate School includes all members of the various faculties who give instruction in approved graduate courses. The general administrative functions of the graduate faculty are delegated to a Graduate Council, of which the Dean of the Graduate School is chairman.

### LOCATION

The University of Maryland is located at College Park, in Prince George's County, Maryland, on the Baltimore and Ohio Railroad, eight miles from Washington and thirty-two miles from Baltimore. Washington, with its wealth of resources, is easily accessible by train, street car and bus.

The professional schools of Medicine, Nursing, Pharmacy, Dentistry and Law are located in Baltimore, at the corner of Lombard and Greene Streets.

### LIBRARIES

In addition to the resources of the University libraries the great libraries of the National Capital are easily available for reference work. Because of the proximity of these libraries to College Park they are a valuable asset to research and graduate work at the University of Maryland.

The library building at College Park contains a number of seminar rooms and other desirable facilities for graduate work.

### THE GRADUATE CLUB

The graduate students maintain an active Graduate Club. Several meetings for professional and social purposes are held during the year. Students working in different departments have an opportunity to become acquainted with one another and thus profit by the broad cultural values derived from contacts with fellow students working in different fields.

## GENERAL REGULATIONS

### ADMISSION

An applicant for admission to the Graduate School must hold a bachelor's or a master's degree from a college or university of recognized standing. The applicant shall furnish an official transcript of his collegiate

record which for unconditional admission must show creditable completion of an adequate amount of undergraduate preparation for graduate work in his chosen field. Application for admission to the Graduate School should be made prior to dates of registration on blanks obtained from the office of the Dean.

After approval of the application a matriculation card, signed by the Dean, is issued to the student. This card permits one to register in the Graduate School. After payment of the fee, the matriculation card is stamped and returned to the student. It is his certificate of membership in the Graduate School and should be retained by the student to present at each succeeding registration.

Admission to the Graduate School does not necessarily imply admission to candidacy for an advanced degree.

### REGISTRATION

All students pursuing graduate work in the University, even though they are not candidates for higher degrees, are required to register in the Graduate School at the beginning of each semester. Students taking graduate work in the summer session are also required to register in the Graduate School at the beginning of each session. In no case will graduate credit be given unless the student matriculates and registers in the Graduate School. The program of work for the semester or the summer session is arranged by the student with the major department and entered upon two course cards, which are signed first by the professor in charge of the student's major subject and then by the Dean of the Graduate School. One card is retained by the Dean. The student takes the other card, and in case of a new student, also the matriculation card, to the Registrar's office, where the registration is completed. Students will not be admitted to graduate courses until the Registrar has certified to the instructor that registration has been completed. Course cards may be obtained at the Registrar's office or at the Dean's office. The heads of departments usually keep a supply of these cards in their respective offices.

### GRADUATES COURSES

Graduate students must elect for credit in partial fulfillment of the requirements for higher degrees only courses designated **For Graduates** or **For Graduates and Advanced Undergraduates**. Graduate students who are inadequately prepared for graduate work in their chosen fields or who lack prerequisites for minor courses may elect a limited number of courses numbered from 1 to 99 in the general catalogue, but graduate credit will not be allowed for these courses. Courses that are audited are registered for in the same way, and at the same fees, as other courses.

### PROGRAM OF WORK

The professor who is selected to direct a student's thesis work is the student's adviser in the formulation of a graduate program, including suitable minor work, which is arranged in cooperation with the instructors.



To encourage thoroughness in scholarship through intensive application, graduate students in the regular sessions are limited to a program of thirty credit hours for the year. If a student is preparing a thesis during the minimum residence for the master's degree, the registration in graduate courses should not exceed twenty-four hours for the year.

### SUMMER GRADUATE WORK

Graduate work in the summer session may be counted as residence toward an advanced degree. By special arrangement, graduate work may be pursued during the entire summer in some departments. Such students as graduate assistants, or others who may wish to supplement work done during the regular year, may satisfy one-third of an academic year's residence by full-time graduate work for eleven or twelve weeks, provided satisfactory supervision and facilities for summer work are available in their special fields.

The University publishes a special bulletin giving full information concerning the summer session and the graduate courses offered therein. The bulletin is available upon application to the Registrar of the University.

### GRADUATE WORK IN PROFESSIONAL SCHOOLS AT BALTIMORE

Graduate courses and opportunities for research are offered in some of the professional schools at Baltimore. Students pursuing graduate work in the professional schools must register in the Graduate School, and meet the same requirements and proceed in the same way, as do graduate students in other departments of the University.

The graduate courses in the professional schools are listed on pages 110 to 118.

### GRADUATE WORK BY SENIORS IN THIS UNIVERSITY

Seniors who have completed all their undergraduate courses in this University by the end of the first semester, and who continue their residence in the University for the remainder of the year, are permitted to register in the Graduate School and secure the privileges of its membership, even though the bachelor's degree is not conferred until the close of the year.

A senior of this University who has nearly completed the requirements for the undergraduate degree may, with the approval of his undergraduate dean and the Dean of the Graduate School, register in the undergraduate college for graduate courses, which may later be transferred for graduate credit toward an advanced degree at this University, but the total of undergraduate and graduate courses must not exceed fifteen credits for the semester. Excess credits in the senior year cannot later be transferred unless such prearrangement is made. Graduate credits earned during the senior year may not be used to shorten the residence period required for advanced degrees.

### ADMISSION TO CANDIDACY FOR ADVANCED DEGREES

Application for admission to candidacy for the Master's and for the Doctor's degree is made on application blanks which are obtained at the

office of the Dean of the Graduate School. These are filled out in duplicate and after the required endorsements are obtained, the applications are acted upon by the Graduate Council. An official transcript of the candidate's undergraduate record and any graduate courses completed at other institutions must be on file in the Dean's office before the application can be considered.

Admission to candidacy in no case assures the student of a degree, but merely signifies he has met all the formal requirements and is considered by his instructors sufficiently prepared and able to pursue such graduate study and research as are demanded by the requirements of the degree sought. The candidate must show superior scholarship by the type of graduate work already completed.

Application for admission to candidacy is made at the time stated in the sections dealing with the requirements for the degree sought.

### REQUIREMENTS FOR THE DEGREES OF MASTER OF ARTS AND MASTER OF SCIENCE

**Advancement to Candidacy.** Each candidate for the Master's degree is required to make application for admission to candidacy not later than the date when instruction begins for the second semester of the academic year in which the degree is sought (or in case of a summer school student, at the end of the third summer's residence), but not until at least twelve semester course hours of graduate work have been completed. An average grade of "B" in all major and minor subjects is required.

**Minimum Residence.** A residence of at least one full academic year, or its equivalent, at this institution, is required.

By carrying approximately six semester hours of graduate work for four summer sessions at this institution, a student may fulfill the residence requirements for the degree of Master of Arts or Master of Science, provided that the greater part of the thesis work can be done under direction during the periods between summer sessions. In some instances a fifth summer of residence may be required in order that a satisfactory thesis may be completed.

**Course Requirements.** A minimum of twenty-four semester hours, exclusive of research, with an average "B" grade in courses approved for graduate credit, is required for the degrees of Master of Arts and Master of Science. If the student is inadequately prepared for the required graduate courses, either in the major or minor subjects, additional courses may be required to supplement the undergraduate work. Of the twenty-four hours required in graduate courses, not less than twelve semester hours and not more than sixteen semester hours must be earned in the major subject. The remaining credits must be outside the major subject and must comprise a group of coherent courses intended to supplement and support the major work. Not less than one-half of the total required course credits for the degree, or a minimum of twelve, must be selected from courses numbered 200 or above. No credit for the degree of Master of Arts or Master of Science may be obtained for correspondence or extension courses. The entire course of study must constitute a unified program approved by the student's major adviser and by the Dean of the Graduate



School.

**Transfer of Credit.** Credit, not to exceed six hours, obtained at other recognized institutions may be transferred and applied to the course requirements of the Master's degree, provided that the work was of graduate character, and provided that it is approved for inclusion in the student's graduate program at the University of Maryland. This transfer of credit is submitted to the Graduate Council for approval when the student applies for admission to candidacy for the degree. Acceptance of the transferred credit does not reduce the minimum residence requirement. The candidate is subject to final examination by this institution in all work offered for the degree.

**Thesis.** In addition to the twenty-four semester hours in graduate courses a satisfactory thesis is required of all candidates for the degrees of Master of Arts and Master of Science. It must demonstrate the student's ability to do independent work and it must be acceptable in literary style and composition. It is assumed that the time devoted to thesis work will be not less than the equivalent of six semester hours earned in graduate courses. With the approval of the student's major professor and the Dean of the Graduate School, the thesis in certain cases may be prepared in *absentia* under direction and supervision of a member of the faculty of this institution.

The original copy of the thesis must be deposited in the office of the Graduate School not later than two weeks before commencement. An abstract of the contents of the thesis, 200 to 250 words in length, must accompany it. A manual giving full directions for the physical make-up of the thesis is in the hands of each professor who directs thesis work, and should be consulted by the student before the typing of the manuscript is begun. Individual copies of this manual may be obtained by the student at the Dean's office, at nominal cost.

**Final examination.** The final oral examination is conducted by a committee appointed by the Dean of the Graduate School. The student's adviser acts as the chairman of the committee. The other members of the committee are persons under whom the student has taken most of his major and minor courses. The chairman and the candidate are notified of the personnel of the examining committee at least one week prior to the period set for oral examinations. The chairman of the committee selects the exact time and place for the examination and notifies the other members of the committee and the candidate. The examination should be conducted within the dates specified and a report of the committee sent to the Dean as soon as possible after the examination. A special form for this purpose is supplied to the chairman of the committee. Such a report is the basis upon which recommendation is made to the faculty that the candidate be granted the degree sought. The period for the oral examination is usually about one hour, but the time should be long enough to insure an adequate examination.

The examining committee also approves the thesis, and it is the candidate's obligation to see that each member of the committee has ample opportunity to examine a copy of the thesis prior to the date of the examination.

A student will not be admitted to final examination until all other requirements for the degree have been met. In addition to the oral examination a comprehensive written examination may be required at the option of the major department.

## REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION

**Course Requirements.** Thirty hours of course work are required, which may include courses in departments other than Education not to exceed one-half of the total thirty hours, such courses to be selected in conformity with the student's special needs as agreed upon by the student and his adviser. Of the thirty hours, not less than one-half must be on the 200 level.

At least four of the thirty hours must be seminar work, which shall include one or more seminar papers in the student's major field of concentration in the Department of Education.

Included in the program must be courses in educational statistics and in procedure of educational research.

A maximum of six hours of graduate credit may be earned in a summer session and not more than six hours may be transferred from another institution.

The requirements in regard to advancement to candidacy, transfer of credits, and final oral examination are the same as for the degrees of Master of Arts and Master of Science.

## REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

**Advancement to Candidacy.** Candidates for the Doctor's degree must be admitted to candidacy not later than one academic year prior to the granting of the degree. Applications for admission to candidacy for the Doctor's degree are filled out by the student and submitted to his major department for further action and transmission to the Dean of the Graduate School, not later than the first Wednesday in October of the academic year in which the degree is sought.

The applicant must have obtained from the head of the Modern Language Department a statement that he possesses a reading knowledge of French and German. Preliminary examinations or such other substantial tests as the departments may elect are also required for admission to candidacy.

**Residence.** Three years of full-time resident graduate study are required. The first two of the three years may be spent in other institutions offering standard graduate work. On a part-time basis the time needed will be correspondingly increased. All work at other institutions offered in partial fulfillment of the requirements for the Ph.D. degree is approved by the Graduate Council, upon recommendation of the department concerned, when the student is admitted to candidacy for the degree.

The Doctor's degree is not given merely as a certificate of residence and work, but is granted only upon sufficient evidence of high attainments in scholarship, and ability to carry on independent research in the special field in which the major work is done.

**Major and Minor Subjects.** The candidate must select a major and one or two closely related minor subjects. The minor work required varies from twenty-four to thirty hours at the discretion of the department concerned. The remainder of the required residence is devoted to intensive study and research in the major field. The amount of required course work in the major subject will vary with the department and the individual candidate. The candidate must register for a minimum of twelve semester hours of research.

**Thesis.** The ability to do independent research must be shown by a dissertation on some topic connected with the major subject. An original typewritten copy and two clear, plain carbon copies of the thesis, together with an abstract of the contents, 250 to 500 words in length, must be deposited in the office of the Dean at least three weeks before commencement. It is the responsibility of the student also to provide copies of the thesis for the use of the members of the examining committee prior to the date of the final examination.

The original copy should not be bound by the student, as the university later binds uniformly all theses for the general university library. The carbon copies are bound by the student in cardboard covers which may be obtained at the students' supply store; one is later sent to the university library and one to the Library of Congress. The abstracts are published by the university in a special bulletin.

A manual giving full directions for the physical make-up of the thesis is in the hands of each professor who directs thesis work, and should be consulted by the student before typing of the thesis is begun. Students may obtain copies of this manual at the Dean's office, at nominal cost.

**Final Examination.** The final oral examination is held before a committee appointed by the Dean. One member of this committee is a representative of the graduate faculty who is not directly concerned with the student's graduate work. One or more members of the committee may be persons from other institutions who are distinguished scholars in the student's major field.

The duration of the examination is approximately three hours, and covers the research work of the candidate as embodied in his thesis, and his attainments in the fields of his major and minor subjects. The other detailed procedures are the same as those stated for the Master's examination.

## **RULES GOVERNING LANGUAGE EXAMINATIONS FOR CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY**

1. A candidate for the Doctor's degree must show in a written examination that he possesses a reading knowledge of French and German. The passages to be translated will be taken from books and articles in his specialized field. Some 300 pages of text from which the applicant wishes to have his examination chosen should be submitted to the head of the Department of Modern Languages at least three days before the examination. The examination aims to test ability to use the foreign language for

research purposes. It is presumed that the candidate will know sufficient grammar to distinguish inflectional forms and that he will be able to translate readily in two hours about 500 words of text, with the aid of a dictionary.

2. Application for admission to these tests must be filed in the office of the Department of Modern Languages at least three days in advance of the tests.

3. No penalty is attached to failure in the examination, and the unsuccessful candidate is free to try again at the next date set for these tests.

4. Examinations are held near the office of the Department of Modern Languages, on the last Wednesday in September and the first Wednesdays in February and June, at 2 p. m.

### GRADUATE FEES

The fees paid by graduate students are as follows:

#### All Students:

A matriculation fee of \$10.00. This is paid once only, upon admission to the Graduate School.

A diploma fee (Master's degree), \$10.00.

A graduate fee, including hood (Doctor's degree), \$20.00.

#### College Park:

A fixed charge, each semester, of \$6.00 per semester credit hour for students carrying eight hours or less; for students carrying more than eight hours, \$50.00 for the semester.

Laboratory fees range from \$2.00 to \$8.00 per course per semester.

#### Baltimore:

**School of Medicine:** A fixed charge, each semester, of \$8.00 per semester credit hour. Laboratory fees range from \$10.00 to \$20.00 per course.

**School of Pharmacy:** A fixed charge, each semester, of \$6.00 per semester credit hour. This fee is required of all graduate students except assistants, who will pay only a laboratory fee of \$3.00 per semester credit hour.

#### Summer Sessions, College Park:

Students in the Summer Session pay the regular matriculation and diploma fees. The hour credit fee is as follows:

A full load of six semester hours, \$25.00.

A load of less than six semester hours, \$6.00 per semester credit hour.

#### Living Expenses:

Board and lodging are available in many private homes in College Park and vicinity. The cost of board and room ranges from about \$35.00 to \$45.00 a month, depending on the desires of the individual. A list of accommodations is maintained in the offices of the Dean of Women and of the Dean of Men.



### FELLOWSHIP AND ASSISTANTSHIPS

**Fellowships.** A number of fellowships have been established by the University. The stipend for the University fellows is \$400 to \$500 for the academic year and the remission of all graduate fees except the diploma fee. Several industrial fellowships, with varying stipends, are also available in certain departments.

Fellows are required to render minor services prescribed by their major departments. The usual amount of service required does not exceed twelve clock hours per week. Fellows are permitted to carry a full graduate program, and they may satisfy the residence requirement for higher degrees in the normal time.

**Scholarships.** A limited number of scholarships are available, carrying a stipend of from \$150 to \$200, without remission of fees. Scholarships are awarded on the basis of ability and of financial need. Scholars carry full time work and only minor services are required by the departments.

Applications for fellowships and scholarships are made on blanks which may be obtained from the office of the Graduate School. The application, with the necessary credentials, is sent by the applicant directly to the Dean of the Graduate School. Applications which are approved by the Dean are forwarded to the departments, where final selection of the fellows and scholars is made. The awards of University fellowships and scholarships are on a competitive basis.

**Graduate Assistantships.** A number of teaching and research graduate assistantships are available in several departments. The compensation for these assistantships is \$600 to \$1000 a year and the remission of all graduate fees except the diploma fee. Graduate assistants are appointed for one year and are eligible to reappointment. The assistant in this class devotes one half of his time to instruction or to research in connection with Experiment Station projects, and he is required to spend two years in residence for the Master's degree. If he continues in residence for the Doctor's degree, he is allowed two-thirds residence credit for each academic year at this University. The minimum residence requirement from the Bachelor's degree, therefore, may be satisfied in four academic years and one summer, or three academic years and three summer sessions of eleven or twelve weeks each.

Applications for graduate assistantships are made directly to the departments concerned, and appointments are made through the regular channels for staff appointments. Further information regarding these assistantships may be obtained from the department or college concerned.

### COMMENCEMENT

Attendance is required at the commencement at which the degree is conferred, unless the candidate is excused by the Dean of the Faculty.

Application for diploma must be filed in the office of the Registrar before April 1 of the year in which the candidate expects to obtain a degree.

Academic costume is required of all candidates at commencement. Those who so desire may purchase or rent caps and gowns at the Students' Supply Store. Order must be filed before April 1, but may be cancelled later if the student finds himself unable to complete his work for the degree.

## DESCRIPTION OF COURSES

For the convenience of students in making out schedules of studies, the subjects in the following Description of Courses are arranged alphabetically:

	Page
Agricultural Economics .....	17
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Agronomy (Crops and Soils) .....	21
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Bacteriology .....	23, 111, 115
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Botany .....	26, 115
Business Administration .....	29
Chemistry .....	38
Chemical Engineering .....	59
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Classical Languages .....	44
Comparative Literature .....	44
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Economics .....	49
Education .....	52
English Language and Literature .....	65
Entomology .....	71
French .....	86
German .....	87
History .....	73
Home Economics .....	77
Horticulture .....	80
Mathematics .....	82
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Modern Languages .....	86
Pharmaceutical Chemistry .....	116
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Physics .....	91
Physiology .....	113
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Poultry Husbandry .....	98
Psychology .....	100
Sociology .....	103
Spanish .....	89
Zoology .....	107

For convenience in identification, Courses for Graduates and Advanced Undergraduates are numbered 100 to 199; Courses for Graduates are numbered 200 and upward.

The letter following the number of the course indicates the semester in which the course is offered: Thus, 100 f is offered the first semester; 101 s, the second semester; 102 y, the year.

The number of semester hours' credit is shown by the arabic numeral in parentheses after the title of the course. In courses which continue through the year, the number shown is the total for both semesters.

A separate schedule of courses is issued each semester, giving the hours, places of meeting, and other information required by the student in making out his schedule. Students will obtain these schedules when they register.

## AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**A. E. 100 f. Farm Economics (3)**—Three lectures. Prerequisite, Econ. 51 y or Econ. 57.

A general course in agricultural economics, with special reference to population trend, cultural wealth, land tenure, farm labor, agricultural credit, the tariff, price movements, and marketing. DeVault.

**A. E. 102 s. Marketing of Farm Products (3)**—Three lectures. Prerequisite, Econ. 51 y or Econ. 57.

A complete analysis of the present system of transporting, storing, and distributing farm products, and a basis for intelligent direction of effort in increasing the efficiency of marketing methods. DeVault.

**A. E. 103 f. Cooperation in Agriculture (3)**—Three lectures.

Historical and comparative development of farmers' cooperative organizations with some reference to farmer movements; reasons for failure, and essentials to success; commodity developments; the Federal Farm Board; banks for cooperatives; present trends. Poffenberger.

**A. E. 104 s. Farm Finance (3)**—Three lectures.

Agricultural credit requirements; development and volume of business of institutions financing agriculture; financing specific farm organizations and industries. Farm insurance—fire, crop, livestock and life insurance, with especial reference to mutual developments; how provided, benefits, and needed extension. Poffenberger.

**A. E. 105 s. Food Products Inspection (2)**—One lecture; one laboratory.

This course, arranged by the Department of Agricultural Economics in cooperation with the State Department of Markets and the United States Department of Agriculture, is designed to give the students primary instruction in the grading, standardizing and inspection of fruits and vegetables, dairy products, poultry products, meats, and other food products. Theoretical instruction covering the fundamental principles will be given in the form of lectures, while the demonstrational and practical work will be conducted through laboratories and field trips to Washington, D. C., and Baltimore. Staff.

**A. E. 106 s. Prices of Farm Products (3)**—Two lectures; one laboratory.

A general course in prices, price relationships, and price analysis, with emphasis on prices of agricultural products. Poffenberger.

**A. E. 107 s. Analysis of the Farm Business (3)**—One lecture; two laboratories.

A concise, practical course in the keeping, summarizing, and analyzing of farm accounts. Hamilton.

**A. E. 108 f. Farm Management (3)—Three lectures.**

A study of the organization and operation of Maryland farms from the standpoint of efficiency and profits. Students will be expected to make an analysis of the actual farm business and practices of different types of farms located in various parts of the state, and to make specific recommendations as to how these farms may be organized and operated as successful businesses. Hamilton.

**A. E. 109 f, 110 s. Research Problems (1-2, 1-2).**

With the permission of the instructor, students will work on any research problems in agricultural economics which they may choose, or a special list of subjects will be made up from which the students may select their research problems. There will be occasional class meetings for the purpose of making reports on progress of work, methods of approach, etc. DeVault.

**A. E. 111 f. Land Economics (3)—Three lectures.**

Concepts of land economy are discussed, as well as conditions and tendencies influencing land requirements in relation to land resources. A study of major land problems and land policies including: erosion and its control; farm tenancy; tax delinquency and tax reverted lands; land use planning and production control; public policies for facilitating land use adjustments; and directional measures for discouraging undesirable land uses. Coddington.

## COURSES FOR GRADUATES

**A. E. 200 f, 201 s. Special Problems in Farm Economics (2, 2).**

An advanced course dealing more extensively with some of the economic problems affecting the farmer, such as land problems, agricultural finance, farm wealth, agricultural prices, transportation, and special problems in marketing and cooperation. DeVault.

**A. E. 202 y. Seminar (2).**

This course will consist of special reports by students on current economic subjects, and a discussion and criticism of the same by the members of the class and the instructor. DeVault.

**A. E. 203. Research.**

Students will be assigned research work in agricultural economics under the supervision of the instructor. The work will consist of original investigation in problems of agricultural economics, and the results will be presented in the form of a thesis. DeVault.

**A. E. 210 s. Taxation in Relation to Agriculture (2)—Two lectures.**

Principles and practices of taxation in their relation to agriculture, with special reference to the trends of tax levies, taxation in relation to land utilization, taxation in relation to ability to pay and benefits received; a comparison of the following taxes as they affect agriculture: general property tax, income tax, sales tax, gasoline and motor vehicle license



taxes, inheritance tax, and special commodity taxes; possibilities of farm tax reduction through greater efficiency and economies in local government.  
Walker and DeVault.

**A. E. 211 f. Agricultural Taxation in Theory and Practice (3)**—Two lectures; one laboratory.

Ideals in taxation; economic effects of taxation upon the welfare of society; theory of taxation; the general property tax, business and license taxes, the income tax, the sales tax, special commodity taxes, inheritance and estate taxes; recent shifts in taxing methods and recent tax reforms; conflicts and duplication in taxation among governmental units; practical and current problems in taxation.  
Walker and DeVault.

**A. E. 212 f, 213 s. Land Utilization and Agricultural Production (3, 2)**—Two double lecture periods a week.

A presentation, by regions, of the basic physical conditions of the economic and social forces that have influenced agricultural settlement, and of the resultant utilization of the land and production of farm products; followed by a consideration of the regional trends and interregional shifts in land utilization and agricultural production, and the outlook for further changes in each region.  
Baker.

**A. E. 214 s. Consumption of Farm Products and Standards of Living (3)**—Two double lecture periods a week.

A presentation of the trends in population and migration for the nation and by states, of the trends in exports of farm products and their regional significance, of the trends in diet and in per capita consumption of non-food products; followed by a consideration of the factors that appear likely to influence these trends in the future, and of the outlook for commercial as contrasted with a more self-sufficing agriculture.  
Baker.

**A. E. 215 s. Advanced Agricultural Cooperation (2)**—Two lectures.

An appraisal of agricultural cooperation as a means of improving the financial status of farmers. More specifically, the course includes a critical analysis and appraisal of specific types and classes of cooperatives.

Poffenberger.

## AGRICULTURAL EDUCATION AND RURAL LIFE

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**R. Ed. 107 s. Observation and Analysis of Teaching for Agricultural Students (3)**—Two lectures; one laboratory. Prerequisite, Psych. 10 f.

This course deals with analysis of pupil learning in class groups.

Cotterman.

**R. Ed. 109 f. Teaching Secondary Vocational Agriculture (3)**—Three lectures. Prerequisites, R. Ed. 107 s; A. H. 2; D. H. 1; Poultry 1; Soils 1; Agron. 1, 2; Hort. 1, 2; Agr. Engr. 101, 102; A. E. 100, 102, 108 f.

A comprehensive course in the work of high school departments of vocational agriculture. It emphasizes particularly placement, supervised farming programs, the organization and administration of Future Farmer work, and objectives and methods in all-day, continuation, and adult instruction. Cotterman.

**R. Ed. 110 s. Rural Life and Education (3)**—Three lectures.

An intensive study of the educational agencies at work in rural communities, stressing particularly analysis of school patronage areas, the possibilities of normal life in rural areas, early beginnings in rural education, and the conditioning effects of economic differences. The course is designed especially for persons who expect to be called upon to assist in shaping educational and other community programs for rural people. Cotterman.

**R. Ed. 112 s. Departmental Organization and Administration (1)**—One lecture. Prerequisite, R. Ed. 107 s, 109 f.

The work of this course is based upon the construction and analysis of administrative programs for high school departments of vocational agriculture. As a project, each student prepares and analyzes in detail an administrative program for a specific school. Investigations and reports. Cotterman.

**R. Ed. 114 s. Teaching Farm Mechanics in Secondary Schools (1)**—One lecture.

Objectives in the teaching of farm shop; contemporary developments; determination of projects; shop management; shop programs; methods of teaching; equipment; materials of instruction; special projects. Carpenter.

#### COURSES FOR GRADUATES

**R. Ed. 201 f, 202 s. Rural Life and Education (3, 3)**—Prerequisite, R. Ed. 104 s, or equivalent.

A sociological approach to rural education as a movement for a good life in rural communities. It embraces a study of the organization, administration and supervision of the several agencies of public education as component parts of this movement and as forms of social economy and human development. Discussions, assigned readings and major term papers in the field of the student's special interest. Cotterman.

**R. Ed. 207 f, 208 s. Problems in Vocational Agriculture, Related Science, and Shop (1-2, each semester).**

In this course special emphasis is placed upon the current problems facing teachers of vocational agriculture. It is designed especially for persons who have had several years of teaching experience in this field. The three phases of the vocational teacher's program—all day, part-time, and adult work—receive attention. Discussions, surveys, investigations and reports. Cotterman.

**R. Ed. 250 y. Seminar in Rural Education (2-4).**

Problems in the organization, administration and supervision of the several agencies of rural education. Investigation, papers and reports.  
Cotterman.

**R. Ed. 251. Research**—Credit hours according to work done. Students must be specially qualified by previous work to pursue with profit the research to be undertaken.  
Cotterman.

**AGRONOMY**

**A. Crops**

**COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES**

**Agron. 103 f. Crop Breeding (2)**—One lecture; one laboratory. Pre-requisite, Zool. 104 f.

The principles of breeding as applied to field crops and methods used in crop improvement.  
Kemp.

**Agron. 121 s. Methods of Crop and Soil Investigation (2)**—One lecture; one laboratory.

Historical development, trends, and standardization of crop and soil investigational methods at the various experiment stations in the United States and abroad.

**COURSES FOR GRADUATES**

**Agron. 201 y. Crop Breeding (4-10)**—Credits determined by work accomplished.

The content of this course is similar to that of Agron. 103 f, but will be adapted more to graduate students, and more of a range will be allowed in choice of materials to suit special cases.  
Kemp.

**Agron. 203 y. Seminar (2)**—One report period each week.

The seminar is devoted largely to reports by students on current scientific publications dealing with problems in crops and soils.

**Agron. 209. Research**—Credits determined by work accomplished.

With the approval of the head of the department the student will be allowed to work on any problem in agronomy, or he will be given a list of suggested problems from which he may make a selection.  
Staff.

**B. Soils**

**COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES**

**Soils 103 f. Soil Geography (3)**—Two lectures; one discussion period.

Genealogy and classification of soils, the principal soil regions of North America, the nature of the developmental processes in soils, and characteristics of the different soils in Maryland. Field trips will be made to emphasize certain important phases of the subject.

**Soils 112 s. Soil Conservation (3)**—Three lectures.

A study of the factors relating to soil preservation, including the influence of cropping and soil management practices, fertilizer treatments, constructive and destructive agencies of man and nature on conservation, history of research work in soil erosion, and field trips to soil demonstration areas.

Thomas.

## COURSES FOR GRADUATES

**Soils 201. Special Problems and Research (10-12).**

Original investigation of problems in soils and fertilizers.

Staff.

**Soils 202 y. Soil Technology (5 f, 2 s)**—Two lectures, two laboratories, first semester. Two lectures, one laboratory, second semester. Prerequisites, Geology 1, Soils 1, and Chemistry 1.

In the first semester, chemical and physico-chemical study of soil problems as encountered in field, greenhouse, and laboratory. In the second semester, physical and plant nutritional problems related to the soil.

Thomas.

**Soils 204 s. Soil Microbiology (3)**—Two lectures; one laboratory. Prerequisite, Bact. 1.

The microorganisms of the soil in relation to fertility, including the study of the bacteria of the soil concerned in the decomposition of organic matter, nitrogen fixation, nitrification, and sulphur oxidation and reduction, and also such organisms as fungi, algae, and protozoa. A critical study of the methods used by experiment stations in soil microbiological investigational work.

Bodily.

## ANIMAL HUSBANDRY

## COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**A. H. 112 f. Livestock Markets and Marketing (2)**—Two lectures. Prerequisite, A. H. 2 f.

History and development of livestock markets and systems of marketing. Trends of livestock marketing; effect of changes in transportation and refrigeration facilities; the merchandising of meat products. Leinbach.

**A. H. 114 f. Animal Nutrition (3)**—Three lectures. Prerequisites, Chem. 12 Ay and A. H. 102 f.

Processes of digestion, absorption, and metabolism of nutrients; nutritional balances; nature of nutritional requirements for growth, production, and reproduction. Meade.

**A. H. 116 f. Light Horse Production (1)**—One lecture.

A study of the light horse breeds with emphasis on the types and usefulness of each. A full discussion of principles of selection and breeding of light horses is included in this course. Finney, Brueckner, Outhouse.

**A. H. 117 s. Advanced Light Horse Production (1)**—One lecture. Prerequisite, A. H. 116 f.

This course is a continuation of A. H. 116 f. Included is a study of the organization of the light horse farm, proper methods of feeding and training; control of disease; treatment and care of injuries; sale of surplus stock.

Brueckner, Finney, Outhouse.

#### COURSES FOR GRADUATES

**A. H. 201 f or s. Special Problems in Animal Husbandry (2-3)**—Credit given in proportion to amount of work completed.

Problems which relate specifically to the character of work the student is pursuing will be assigned. Staff.

**A. H. 202 f or s. Seminar (1).**

Students are required to prepare papers based upon current scientific publications relating to animal husbandry or upon their research work for presentation before and discussion by the class. Staff.

**A. H. 203. Research**—Credit to be determined by the amount and character of work done.

With the approval of the head of the department, students will be required to pursue original research in some phase of animal husbandry, carry the same to completion, and report the results in the form of a thesis. Meade and Staff.

**A. H. 204 s. Advanced Breeding (2)**—Two lectures. Prerequisites, Zool. 104 f and A. H. 103 s.

This course deals with the more technical phases of heredity, variation recombination, and mutation; selection and selection indices; breeding systems; specific inheritance in farm animals; biometry as applied to animal breeding. Meade.

**A. H. 206 f, 207 s. Advanced Livestock Management (3, 3)**—Two lectures, one laboratory.

An intensive study of the newer developments in animal breeding, animal physiology, animal nutrition, endocrinology and other closely allied fields as they apply to the management and commercial production of livestock. Leinbach.

#### BACTERIOLOGY

##### A. Bacteriology

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES\*

**Bact. 101 f. Milk Bacteriology (4)**—Two lectures; two laboratories. Prerequisite, Bact. 1. Registration limited.

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\* One or more of the scheduled courses may also be given during the evening if a sufficient number of students register. A special fee is charged. For further information address the Department of Bacteriology.



The sources and development of bacteria in milk; milk fermentation; sanitary production; care and sterilization of equipment; care and preservation of milk and cream; pasteurization; public health requirements. Standard methods of milk analysis; the bacteriological control of milk supplies and plant sanitation; occasional inspection trips. Black.

**Bact. 102 s. Dairy Products Bacteriology (3)**—One lecture; two laboratories. Prerequisite, Bact. 1; Bact. 101 f desirable.

Relation of bacteria, yeasts and molds to cream, concentrated milks, fermented milks, starters, butter, ice cream, cheese, and other dairy products; sources of contamination. Microbiological analysis and control; occasional inspection trips. Black.

**Bact. 111 f. Food Bacteriology (3)**—One lecture; two laboratories. Prerequisite, Bact. 1. Registration limited.

Bacteria, yeasts and molds in foods; relation to preservation and spoilage; food infections and intoxication; microbiological examination of normal and spoiled foods; factors affecting preservation. James.

**Bact. 112 s. Sanitary Bacteriology (3)**—One lecture; two laboratories. Prerequisite, Bact. 1. Registration limited.

Bacteriological and public health aspects of water supplies and water purification; swimming pool sanitation, sewage disposal; disposal of garbage and refuse; municipal sanitation. Standard methods for examination of water, sewage and for other sanitary analyses; differentiation and significance of the coli-aerogenes group. Black.

**Bact. 113 f and s. Advanced Methods (2)**—One lecture; one laboratory. Prerequisite, 10 hours of bacteriology. Registration limited.

Microscopy, dark field technique, photomicrography; colorimetric and potentiometric determinations; oxidation-reduction; electrophoresis; surface tension; gas analysis; special culture methods; filtration; staining techniques and preparation of dye solutions; advanced study in reagent preparation. Bodily.

**Bact. 115 f. Serology (4)**—Two lectures, two laboratories. Prerequisite, Bact. 2 s. Registration limited.

Infection and resistance; agglutination, precipitation, complement fixation reactions; principles of immunity and hypersensitiveness. Preparation of necessary reagents; general immunologic technique; factors affecting reactions; applications in identification of bacteria and diagnosis of disease. Faber.

**Bact. 116 s. Epidemiology (2)**—Two lectures. Prerequisite, Bact. 1 and credit in, or concurrent registration in Bact. 2 or 2 A. (Offered in 1941-1942.)

Epidemiology of important infectious diseases, including history, characteristic features, methods of transmission, immunization and control; periodicity; principles of investigation; public health applications. Faber.

**Bact. 117 s. Public Health (1)—One lecture.** Prerequisites, Bact. 1 and 2. Alternates with Bact. 116 s. (Not offered in 1941-1942.)

A series of weekly lectures on public health and its administration.

James, in charge.

**Bact. 118 s. Systematic Bacteriology (2)—Two lectures.** Prerequisite, 10 hours of bacteriology. Offered alternate years. (Offered in 1941-1942.)

History of bacterial classification; genetic relationships, international codes of nomenclature; bacterial variation as it affects classification.

James.

**Bact. 125 f. Clinical Methods (2)—Two laboratories.** Prerequisite, Bact. 2 or consent of instructor.

Methods for microscopic examination of blood; bacteriological examination of sputum, feces and spinal fluids, microscopic and routine chemical methods for examination of urine.

Faber.

#### COURSES FOR GRADUATES

**Bact. 207 f, 208 s. Special Topics (1, 1).** Prerequisite, 10 hours of bacteriology.

Presentation and discussion of fundamental problems and special subjects.

Black.

**Bact. 211 f. Bacterial Metabolism (2)—Two lectures.** Prerequisites, Bact. 1, Chem. 12 y or equivalent.

Growth, nutrition, physiological interrelationships; bacterial enzymes, respiration, fermentation, chemical activities of microorganisms; industrial fermentations.

Black.

**Bact. 221. Research.** Prerequisites, Bact. 1 and 2, and any other courses needed for the particular project. Credit will be determined by the amount and character of the work accomplished.

Properly qualified students will be admitted upon approval of the department head. The investigation is outlined in consultation with and pursued under supervision of a faculty member of the department. Staff.

**Bact. 231 f, 232 s. Seminar (2, 2).** Prerequisite, 10 hours of bacteriology.

Discussions and reports prepared by the student on current research, selected subjects, and recent advances in bacteriology.

James.

#### B. Food Technology

##### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**F. Tech. 100 f. Food Microscopy (2)—Two laboratories.**

Microscopical analysis of foods following the methods used in the Federal Government and other agencies. Studies of the structural composition of agricultural and manufactured foods. Use of microscopic tests in factory control and analyses.

**F. Tech. 108 s. Preservation of Poultry Products (2)**—Two laboratories. Prerequisite, Bact. 1.

Studies of the microbiology of poultry, alive and during storage; microbiology of shell eggs, fresh and during storage; microbiology of frozen and dried eggs. This is taught in cooperation with the Department of Poultry Husbandry. James, Gwin.

**F. Tech. 110 f. Regulatory Control (1)**—One lecture and demonstration. Methods followed in the control of foods in interstate and intrastate commerce. Consideration of laboratory basis of standards of control. James.

**F. Tech. 120 s. Food Sanitation (2)**—Lecture, laboratory and field work. Prerequisites, Bact. 1 and Bact. 111 f, or equivalent. Enrollment limited, with preference given to students majoring in this field.

Principles of sanitation in food manufacture and distribution; methods of control of sanitation in commercial canning, pickling, bottling, preserving, refrigeration, dehydration, etc. James.

**F. Tech. 130 y. Technology Conference (2)**—One lecture. Reports and discussions of current developments in the field of food technology. James.

## BOTANY

### A. General Botany and Morphology

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Bot. 101 f. Plant Anatomy (3)**—One lecture; two laboratories. Prerequisite, Bot. 1 f.

The origin and development of the organs and tissue systems in the vascular plants, with special emphasis on the structures of roots, stems and leaves. Reports on current literature are required. Bamford.

**Bot. 104 f. Advanced Plant Taxonomy (3)**—One lecture; two laboratories. Prerequisite, Bot. 5 s.

Principles and criteria of plant taxonomy. Reviews and criticisms of current taxonomic literature. Emphasis on the identification and recognition of the Compositae and other species blooming in the fall. Each student works on a special problem during the laboratory time. Norton.

**Bot. 105 s. Economic Plants (2)**—Two lectures. Prerequisite, Bot. 1 f and 5 s.

The names, taxonomic position, native and commercial geographic distribution, and use of the leading economic plants of the world are studied. A collection of plant products from markets, stores, factories, etc., is made by students to illustrate the useful plants both in the natural form and as used by man. Norton.



**Bot. 106 f. History and Philosophy of Botany (1)**—One lecture.

Discussion of the development of ideas and knowledge about plants, also a survey of contemporary work in botanical science. Norton.

**Bot. 107 f or s. Plant Microtechnique (3)**—Two laboratories. Prerequisite, Bot. 1 f and 3 s, or equivalent.

Principles and methods involved in the preparation of permanent microscope slides of plant materials. Practice with the most generally used techniques on a variety of tissues. An opportunity for the student to make a private collection of several hundred slides. Brown.

#### COURSES FOR GRADUATES

**Bot. 201 s. Cytology (4)**—Two lectures; two laboratories. Prerequisites, Bot. 1 f, Zool. 104 f, Bot. 107 s, or equivalent.

A detailed study of the cell during its metabolic and reproductive stages. The major portion is devoted to chromosomes in mitosis and meiosis, and the relation of these stages to current theories of heredity and evolution. The laboratory involves the preparation, examination and illustration of cytological material by current methods. Bamford.

**Bot. 202 s. Plant Morphology (2)**—Two laboratories. Prerequisites, Bot. 1 f, Bot. 3 s, 5 s, and 101 f.

A comparative study of the morphology of the flowering plants with special reference to their phylogeny and development. Bamford.

**Bot. 203 f and s. Seminar (1).**

The study of special topics in plant morphology, anatomy, and cytology. Bamford.

**Bot. 204. Research.** Credit according to work done. Norton, Bamford.

#### B. Plant Pathology

##### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Plt. Path. 101 f, 102 s. Diseases of Special Crops (3-3)**—Three lectures. Prerequisite Plt. Path. 1 f or equivalent.

First semester, diseases of fruits and ornamentals; second semester diseases of garden and field crops. (With consent of department, student may register and receive credit for one semester only.) Intended for students of plant pathology, horticulture, agronomy, entomology, who wish to obtain more detailed information on diseases of special crops than is available in Plt. Path. 1 f. Lectures are given by different members of the staff who are specialists in the fields covered.

Woods, Jehle, McClellan, Cox, Jeffers.

**Plt. Path. 106 f or s. Seminar (1).**

Conferences and reports on plant pathological literature and on recent investigations. Jehle, Woods.

**Plt. Path. 108 f. Mycology (4)**—Two lectures; two laboratories. Prerequisite, Bot. 1 f.

An introductory study of the morphology, life histories, classifications, and economics of the fungi. Norton, Woods.

#### COURSES FOR GRADUATES

**Plt. Path. 201 s. Virus Diseases (2-3)**—Two lectures; or two lectures and one laboratory.

Consideration of the physical, chemical, and physiological aspects of plant viruses and plant virus diseases. The laboratory credit is earned by partially independent work. The instructor should be consulted before registering for laboratory credit. Woods.

**Plt. Path. 203 f. Non-parasitic Diseases (3)**—Two lectures; one laboratory. (Not given in 1941-1942.)

Effects of maladjustment of plants to their environment; injuries due to climate, soil, gases, dust, sprays, fertilizers, improper treatment, and other detrimental conditions.

**Plt. Path. 205. Research.** Credit according to work done. Staff.

**Plt. Path. 206 f. Plant Disease Control (3)**—Three lectures.

An advanced course dealing with the theory and practices of plant disease control. A good general knowledge of elementary plant pathology is presupposed. Jeffers, Jehle, McClellan, Cox, Woods.

**Plt. Path. 209 f. Advanced Seminar (1)**—One two-hour meeting bi-weekly.

Attention is given to the advanced technical literature of phytopathology. Woods.

#### C. Plant Physiology

##### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Plt. Phys. 101 f. Plant Physiology (4)**—Two lectures; two laboratories. Prerequisite, Bot. 1 f.

A summary view of the general physiological activities of plants. The aim in this course is to stress principles rather than factual details. Brown.

**Plt. Phys. 102 s. Plant Ecology (3)**—Two lectures; one laboratory. Prerequisites, Bot. 1 f and 5 s.

The study of plants in relation to their environments. Plant formations and successions in various parts of the country are briefly treated. Much of the work, especially the practical, must be carried on in the field, and for this purpose type regions adjacent to the University are selected. Brown.

## COURSES FOR GRADUATES

**Plt. Phys. 201 s. Plant Biochemistry (4)**—Two lectures; two laboratories. Prerequisite, an elementary knowledge of plant physiology and organic chemistry. (Not given in 1941-1942.)

An advanced course in plant physiology in which the chemical aspects are specially emphasized. It deals with the important substances in the composition of the plant body and with the important processes in plant life.  
Appleman, Shirk.

**Plt. Phys. 202 A f. Plant Biophysics (2)**—Two lectures. Prerequisites, Bot. 1 f, Plt. Phys. 101 f, or equivalent. Students electing this course should elect Plt. Phys. 202 B f.

An advanced course dealing with the operation of physical forces in plant life processes.  
Appleman, Shirk.

**Plt. Phys. 202 B f. Biophysical Methods (2).** Shirk.

**Plt. Phys. 203 s. Plant Microchemistry (2)**—One lecture; one laboratory. Prerequisite, Bot. 1 f, Chem. 1 y, or equivalent.

The isolation, identification, and localization of organic and inorganic substances found in plant tissues by micro-technical methods. The use of these methods in the study of metabolism in plants is emphasized. Brown.

**Plt. Phys. 204 f. Growth and Development (2).** Prerequisite, 12 hours plant science. (Not given in 1941-1942.) Appleman.

**Plt. Phys. 205 f or s. Mineral Nutrition Seminar (1).**

Students are required to prepare reports of papers in the current literature. These are discussed in connection with the recent advances in the subject.  
Appleman.

**Plt. Phys. 206. Research**—Credit according to work done.

Students must be specially qualified by previous work to pursue with profit the research to be undertaken.  
Staff.

## BUSINESS ADMINISTRATION

(See also related courses in Economics and in Agricultural Economics.)

## A. Accounting

## COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Acct. 101 f. Advanced Accounting I (3)**—Three lectures. Prerequisite, Acct. 51 y.

Advanced theory and problems in connection with the following: working papers, statements; corporations; actuarial science; cash; accounts receivable; notes and acceptances; inventories, consignments; installment sales.

**Acct. 102 s. Advanced Accounting II (3)**—Three lectures. Prerequisite, Acct. 101 f.

Advanced theory and problems in connection with the following: tangible fixed assets; intangible assets; investments; liabilities; funds and reserves; correction of statements and books; comparative statements; the analysis of working capital; miscellaneous ratios; profit and loss analysis; and statement of application of funds. Cissel.

**Acct. 121 f. Cost Accounting (2)**—Two lectures. Prerequisite, Acct. 51 y.

The need and value of cost accounting; cost systems and cost classifications; classification of accounts; subsidiary ledgers and cost records; outline of specific order cost accounting; accounting for material, material storage and consumption; valuation of materials; special features of accounting for labor cost; accounting for manufacturing expense; distribution of service department costs; distribution of manufacturing expense to production; control of distribution costs; monthly closing entries. Theory, problems, and practice set. Cissel.

**Acct. 122 s. Advanced Cost Accounting (2)**—Two lectures. Prerequisite, Acct. 121 f.

Preparation of analytical statements; comparative statements; process cost accounting; standard costs; analysis of variances; accounting for standard costs; estimating cost systems; arguments for and against including interest on investments; graphic charts; uniform methods. A discussion of advanced theory and problems. Cissel.

**Acct. 161 f. Income Tax Procedure (3)**—Three lectures. Prerequisite, Acct. 102 s.

Income tax in theory and practice. Selected cases and problems illustrating the definition of taxable income of individuals, corporations, and estates. Wedeberg.

**Acct. 171 f. Auditing Theory (2)**—Two lectures. Prerequisite, Acct. 102 s.

Principles of auditing, including a study of different kinds of audits, the preparation of reports, and illustrative cases or problems. Cissel.

**Acct. 172 s. Practical Auditing (2)**—Two lectures. Prerequisite, Acct. 171 f.

A practical application of auditing theory. Cissel.

**Acct. 181 f. Specialized Accounting (3)**—Three lectures. Prerequisite, Acct. 102 s.

Accounting for partnerships, ventures, insurance, receiverships, branches, consolidations, mergers, foreign exchange, estates and trusts, budgets, and public accounts. Wedeberg.

**Acct. 182 s. Specialized Accounting (3)**—Three lectures Prerequisite, Acct. 181 f.

A study of the accounting methods and problems of the following types of business: savings banks, commercial banks, national banks, building and loan associations, stock brokerage, consignments, department stores, real estate, extractive industries, hotels, government, electric utilities, and others. Wedeberg.

**Acct. 186 s. C. P. A. Problems (3)**—Three lectures. Prerequisite, consent of instructor.

This course is arranged to coordinate all previous work in accounting with special emphasis on the solution of practical C. P. A. problems and the discussion of C. P. A. theory. Wedeberg.

#### COURSES FOR GRADUATES

**Acct. 228 f, 229 s. Accounting Systems (3, 3).** Prerequisites, Acct. 181 and 182, or concurrent registration therein.

A discussion of the more difficult problems in connection with the industries covered in Acct. 181 and 182. Also includes the statement of affairs; realization and liquidation account; parent and subsidiary accounting, and financing. Wedeberg.

**Acct. 298 f, 299 s. Special Problems in Accounting (3, 3).** Prerequisite, preliminary courses in the field of specialization, and permission of the instructor. Wedeberg.

#### B. Finance

##### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Finance 105 f. Consumer Financing (3).** Prerequisite, Econ. 51 y or 57. The economics of installment selling; methods of financing the consumer; operations of the personal finance company. Gruchy.

**Finance 106 f. Public Finance (3).** Prerequisite, Econ. 51 y or 57. The nature of public expenditures; sources of revenue; taxation; budgeting. Special emphasis on the practical, social, and economic problems involved. Gruchy.

**Finance 111 f. Corporation Finance (3).** Prerequisite, Econ. 51 y. The organization and financing of a business enterprise; types of securities and their utilization in apportioning income, risk, and control; problems of capitalization, refunding, reorganization, and expansion; procurement of capital; public regulation of the sale of securities. Stevens.

**Finance 115 f. Investments (3).** Prerequisite, Finance 111 f. Sources of information for the investor. Classes of investments: government bonds, municipals, real estate mortgages, public utilities, railroads, industrial securities; movement of security prices; analysis of



financial statements. Adapting the investment policy to the purpose and needs of the investor. Mullin.

**Finance 116 s. Investment Banking (3).** (Not offered in 1941-1942.)

A study of the functions and operations of investment banking institutions and their relation to the market for long-term credit, with emphasis on the trends and problems of investment banking. Gruchy.

**Finance 118 f. Stock and Commodity Exchanges (3).** (Not offered in 1941-1942.)

An analysis of the operations of the various exchanges. Brokerage houses and methods of trading; regulation of the exchanges. Gruchy.

**Finance 121 s. Advanced Banking Principles and Practices (3).**

The incorporation, organization, and operation of banks; functions of departments and problems of customer relations; bank legislation and governmental regulation. Gruchy.

**Finance 125 f. Credits and Collections (3).**

Nature and function of credit and use of credit instruments; principles of credit investigation and analysis; the work of the credit manager. Bennett.

**Finance 129 s. International Finance (3).**

Foreign exchange theory and practice; international aspects of monetary and banking problems; international money markets; the gold problem and The Bank for International Settlements. Gay.

**Finance 143 f. Property, Casualty and Liability Insurance (2).** Prerequisite, Econ. 51 y.

A survey of fire, ocean marine and inland marine insurance, liability risks and casualty coverages, surety and fidelity bonds, and miscellaneous insurance coverages. Analysis of the insurance contract, kinds of carriers, application of insurance law. Economics and social implications are stressed. Fisher.

**Finance 144 f. Life, Group and Social Insurance (2).** Prerequisite, Econ. 51 y.

Principles of life insurance, including kinds of policies, net and gross premiums, functions of the reserve, life insurance investments, state regulation, industrial insurance, group insurance and annuity contracts. Development and present status of social insurance in the United States. The economic significance of personal insurance to the individual and to the state. Fisher.

**Finance 151 s. Real Estate (3).** Prerequisite, Econ. 51 y.

The principles and practices involved in owning, operating, merchandising, leasing, and appraising real estate and real estate investments. Bennett.

**Finance 199 s. Financial Analysis and Control (3).** Prerequisite, Finance 111 f.

Internal administration of a business from the viewpoint of the chief executive. Departmentalization and functionalization; anticipation and budgetary control of sales, purchases, production, inventory, expenses, and assets. The coordination of financial administration. Policy determination, analysis and testing. Stevens, Fisher.

#### COURSES FOR GRADUATES

**Finance 201. Research.** Credit in proportion to work accomplished. Students must be especially qualified by previous work to pursue effectively the research to be undertaken. Gruchy.

**Finance 229 f or s. Special Problems in Finance (1-3).** Prerequisite, preliminary courses in the field of specialization and permission of the instructor concerned.

Individual study of specific problems. Stevens, Gruchy.

#### C. Marketing, Merchandising, and Sales Administration

See also related courses in Psychology, especially Psych. 4 s, 140 f, and 141 s, and in the marketing of agricultural products, particularly A. E. 101 s, 102 s, 103 s, 105 s, and 215 s.

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Mkt. 101 f. Marketing Principles (3).** Prerequisite, Econ. 51 y.

A study of the fundamental principles of assembling and dispersing manufactured goods; functions of wholesale and retail middlemen; branch house distribution; mail order and chain store distribution; price and price policies; cash and quality discounts; price maintenance; and a discussion of the problem of distribution costs. Bennett, Reid.

**Mkt. 106 s. Salesmanship (2).** Prerequisites, Econ. 51 y or 57, and Mkt. 101 f, or consent of instructor.

An analysis of the fundamental principles of salesmanship and the technique of personal presentation of ideas, goods, and services. Analysis of customer buying motives, habits, and sales reactions.

Kirkpatrick, Reid.

**Mkt. 108 s. Salesmanagement (2).** Prerequisite, credit or concurrent registration in Mkt. 106 s.

The structure and function of the sales organization and its relation to the activities of the production and other departments. Building, training, equipping, stimulating and supervising a sales force. Reid.

**Mkt. 109 f. Advertising Principles (3).** Prerequisite, Econ. 51 y or 57.

Functions and economic implications of advertising; selection and adaptation of media to various lines of business; layouts, copywriting, and

campaign planning; objectives, appropriations, and measurements of effectiveness. Mullin.

**Mkt. 115 s. Purchasing Technique (3).**

Ascertaining sources of supply, substitutes; utilization of catalogues, files, pooled information, and cooperative purchasing; buying on specifications; sampling, testing, bargaining; terms, discounts, relations with salesmen; procurement, analysis, and interpretation of market and price data; materials control; interdepartmental and office organization.

Kirkpatrick.

**Mkt. 119 s. Retail Store Management and Merchandising (3).** Prerequisite, Mkt. 101 f.

Retail store organization, location, and store policy; pricing policies, price lines, brands, credit policies; records as a guide to buying; budgetary control of inventory and expenses; purchasing methods; supervision of selling; training and supervision of retail sales force; administrative problems.

Kirkpatrick.

**Mkt. 199 s. Marketing Research and Market Policies (3).** Prerequisite, nine credit hours in marketing.

A study of the methods and problems involved in marketing research.

Bennett.

#### COURSES FOR GRADUATES

**Mkt. 201. Research.** Credit in proportion to work accomplished. Students must be especially qualified by previous work to pursue effectively the research to be undertaken.

Stevens, Bennett, Kirkpatrick.

**Mkt. 229 f or s. Problems in Marketing (1-3).** Prerequisite, preliminary courses in the field of specialization, and permission of the instructor.

Individual study of specific problems.

Stevens, Bennett.

#### D. Trade and Transportation

##### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**T. & T. 101 f. Principles of Foreign Trade (3).** Prerequisite, Econ. 51 y, T. & T. 1 f, 4 s.

The basic principles of import and export trade, as influenced by the differences in methods of conducting domestic and foreign commerce.

Gay.

**T. & T. 102 s. World Resources and Industries (3).**

Economic, political and geographic factors affecting the distribution of industries. Problems of industrial migration, land utilization and regional planning. Effects of resource patterns upon current world economic and political developments.

Gay.



**T. & T. 111 f. Inland Transportation (3).** Prerequisite, Econ. 51 y or 57.

The development of railway and truck transportation in the United States; facilities for transporting agricultural and industrial products. Rate structures and tariffs; effects of changing transportation methods upon agricultural and business organization. Gay.

**T. & T. 112 s. Ocean Transportation (2).** Prerequisite, T. & T. 1 f, 4 s.

The development of merchant marine and ocean trade routes; the function of the merchant marine in the present commerce of the world; relation of merchant marine to the railroad and other transportation agencies. Special stress is laid on the history and present position of the American Merchant Marine. Gay.

**T. & T. 121 s. The Technique of Export Trade (1).** Prerequisite, T. & T. 101 f. (Not offered in 1941-1942.)

Practical problems of exporting, including the study of functions of the various exporting agencies; documents and procedures used in exporting transactions. Gay.

**T. & T. 122 s. The Technique of Import Trade (1).** Prerequisite, T. & T. 101 f. (Not offered in 1941-1942.)

The study of methods of procuring goods in foreign countries; financing of import shipments; documentary procedures; clearing through the customs districts; distribution of goods in the United States. Gay.

**T. & T. 123 s. Import and Export Practice (1-2).** Prerequisite, concurrent registration in T. & T. 121 s or 122 f. (Not offered in 1941-1942.)

Practice work in dealing with import and export documents. Field trips are also arranged to Baltimore to study actual import and export procedure. A nominal fee is collected at the time of the field trip to cover the expenses incurred. Gay.

#### FOREIGN TRADING AREAS:

The following three courses apply to particular areas the analysis of foreign markets and methods discussed in Principles of Foreign Trade (T. & T. 101 f). Lecture hours are arranged in such a way that these courses may be taken as a group, or any one or more may be taken independently.

**T. & T. 131 f. Europe as An Export Field (1).** Prerequisite, T. & T. 101, 123. (Not offered in 1941-1942.)

An analysis of the countries of Europe as a market for American goods, including a study of the various products imported, methods of financing, and distribution agencies.

**T. & T. 132 f. Latin America as An Export Field (1).** Prerequisite, T. & T. 101, 123. (Not offered in 1941-1942.)

An analysis of the countries of Central and South America as a market for American goods, including a study of the various products imported, methods of financing, and distribution agencies.

**T. & T. 133 f. Asia as An Export Field (1).** Prerequisite, T. & T. 101, 123. (Not offered in 1941-1942.)

An analysis of the countries of Asia as a market for American goods, including a study of the various products imported, methods of financing, and distribution agencies.

**T. & T. 189 s. International Commerce and Commercial Policy (3).** Prerequisite, T. & T. 131, 132, 133.

Production, availability, and world commerce in the staple commodities of world trade, agricultural, mineral, and manufactured; the effects of the principal commercial policies and treaties.

#### COURSES FOR GRADUATES

**T. & T. 229 s. Special Problems in Foreign Trade (1-3).** Prerequisite, preliminary courses in the field of specialization, and permission of the instructor. Gay.

#### E. Organization and Management

See also related courses in Psychology, especially Psych. 3 s, 160 f, and 161 s.

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**O. & M. 101 s, 102 f. Business Law (3, 3).**

Legal aspects of business relationships, contracts, negotiable instruments, agency, partnerships, corporations, real and personal property, and sales. Graduate students should register in Section A. Fisher.

**O. & M. 103 s. Advanced Business Law (3).** Prerequisite, O. & M. 101 and 102.

The principles of the law of corporations, trusts and the administration of the estates of bankrupts and decedents, presented in a manner calculated to prepare students for the accounting profession in Maryland. Shirley.

**O. & M. 105 f. Business Cycles and Business Indexes (3).** Prerequisites, Stat. 14, Econ. 51 y, and consent of the instructor.

Advanced work in business and economic indexes and time series analysis. Cases in market demand research, cost analysis, production control, and business cycle analysis. Shirley.

**O. & M. 110 f. Fundamentals of Business Administration (2).** Primarily for senior engineers. Graduate students majoring in non-economic subjects may be admitted by special consent of instructor, but course may not be counted toward an advanced degree with a major in Economics or business subjects.

An analysis of the business structure, showing the functions of production, marketing, and finance, and the use of the tools of accounting and statistics. Designed to show the engineer his relationship as a functional specialist to other functional specialists and to give an academic opportunity to apply technical knowledge in business problems. Reid.

**O. & M. 121 s. Industrial Management (3).** Prerequisite, Econ. 51 y or 57.

A study of major problems of management in the acquisition, organization, and control of the factors and agents of production—plant, machinery and equipment, raw materials, and personnel. Factory location and layout; scheduling, personnel organization and incentives. Mullin.

**O. & M. 125 s. Psych. 161 s. Personnel (3).** Prerequisites, Econ. 51 y or 57 and Psych. 3 s or 4 f, or permission of instructor.

A study of the problems involved in the organization and management of personnel in modern business and industry. A consideration of employee selection, measures of ability, methods of developing and maintaining personnel efficiency. Supplementary reading material for Economics or Business. Administration majors will conform to the individual's particular interests. See also related course, Econ. 133 f, Industrial Relations. Clark, Wyckoff, Marshall.

**O. & M. 161 s. Problems in Cooperative Administration (1-3).** Prerequisites, six semester hours in accounting, three in finance, eight in economics, three in statistics, three in organization and management, and three in cooperative theory.

A seminar course in the practical problems of cooperative management that is intended to integrate previous managerial courses. A limited amount of travel is required, for which a nominal fee is collected at the time of each field trip to cover the expenses incurred. Clark.

**O. & M. 172 s. Trade and Commercial Organizations (3).** Prerequisite, Econ. 52.

Objectives of trade and commercial organizations. Structure, financing, membership building, committee organization and procedure, conventions and program building, collection and dissemination of information. Public responsibilities. Stevens, Clark.

**O. & M. 195 f, 196 s. Special Problems in Business Administration (3).** Prerequisites, preliminary courses in Business Administration and the field of specialized study, high scholastic standing, and consent of the instructor.

Independent study of business problems in a specialized field. The method of individual conferences and reports. For students of initiative, resourcefulness, maturity, and high scholastic standing who wish to do extensive organized reading in a special field of business administration. Stevens and others.

## COURSES FOR GRADUATES

**O. & M. 201. Research.** Credit in proportion to work accomplished. Student must be especially qualified by previous work to pursue effectively the research to be undertaken.

Investigation or original research in problems of business organization and operation under supervision of the instructor. Staff.

**O. & M. 208 s. Legal Aspects of Business Problems (2).** Prerequisites, six semester hours in commercial law, twelve in accounting, nine in economics and six in political science.

Law as an institution conditioning economic behavior. The law applicable to problems in management and production, marketing and finance.

Shirley.

**O. & M. 291 f or s. Problems in Business Organization (1-3).** Prerequisites, preliminary courses in the field of specialization, six semester hours in organization and management, eight in accounting, nine in economics, and three in statistics.

Individual investigation of specific problems, under direction of the instructor. The subjects selected for investigation may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis.

Staff.

## CHEMISTRY

## A. General Chemistry

## COURSES FOR GRADUATES

**Chem. 200 A y. The Chemistry of the Rarer Elements (4)**—Two lectures. Prerequisite, Chem. 2 y.

A course devoted to the study of the elements not usually considered in the elementary course. White.

**Chem. 200 B y. Advanced Inorganic Laboratory (4)**—Two laboratories. Prerequisite, consent of the instructor.

A laboratory study of the compounds of elements considered in Chem. 200 A y. White.

**Chem. 201 f or s. An Introduction to Spectrographic Analysis (1)**—A laboratory course designed to acquaint the student with the fundamentals of spectrographic analysis. White.

**Chem. 233 s. Inorganic Microanalysis (2)**—Two laboratories. Prerequisites, Chem. 2 y and Chem. 6 y or their equivalent.

A laboratory course designed to acquaint a student with the qualitative and quantitative techniques available for the analysis of milligram samples. The qualitative procedures are carried out on the microscope slide, in the microcentrifuge cone, in the capillary, and in the fibre. The quantitative procedures include residue determinations, the use of the filter stick, etc.

Westgate.

**B. Analytical Chemistry**

## COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Chem. 101 y. Advanced Quantitative Analysis (8)**—Two lectures; two laboratories. Prerequisite, Chem. 6 y, or its equivalent.

The first semester is devoted to mineral and gas analysis. During the second semester emphasis is on instrumental analysis. Svirbely.

**Chem. 130 y. Chemical Microscopy (4)**—One lecture; one laboratory. Prerequisite, consent of instructor.

A course designed to acquaint the student with the fundamentals of microscopic analysis. The latter part of the course is devoted to a study of textile fibers. Svirbely.

## COURSES FOR GRADUATES

**Chem. 240 f. Chemical Microscopy (2)**—One lecture; one laboratory.

A more extensive course than 130 y designed to acquaint the student with the fundamentals of microscopic analysis. Svirbely.

**Chem. 241 s. Chemical Microscopy (2)**—One lecture; one laboratory.

Prerequisite, Chem, 240 f.

A course devoted to the study of the optical properties of crystals.

Svirbely.

**Chem. 243 y. Special Problems in Quantitative Analysis (4)**—Two laboratories. Prerequisite, Chem. 6 y. Laboratory work and conferences.

A complete treatment of some special problem or problems, chosen to meet the needs and interest of the individual student. Svirbely.

**C. Organic Chemistry**

## COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Chem. 116 y. Advanced Organic Chemistry (4)**—Two lectures. Prerequisite, Chem. 8 A y and B y, or their equivalent.

A course devoted to a more advanced study of the compounds of carbon than is undertaken in Chem. 8 A y. Graduate students who desire an accompanying laboratory course should elect Chem. 205 and/or 207.

Drake.

**Chem. 117 y. Organic Laboratory (4)**—One lecture and one laboratory.

A course devoted to a study of organic qualitative analysis. The work includes the identification of unknown organic compounds, and corresponds to the more advanced course, Chem. 207. Reeve.

**Chem. 118 y. Advanced Organic Laboratory (2)**—One laboratory.

A study of organic quantitative analysis and the preparation of organic compounds. Quantitative determinations of carbon and hydrogen, nitrogen, and halogen are carried out, and representative syntheses, more difficult than those of Chem. 8 B y, are studied. Reeve.



## COURSES FOR GRADUATES

**Chem. 203 A f. Stereochemistry (2)**—Two lectures. (Not offered in 1941-1942.)

A comprehensive study of stereoisomerism.

Drake.

**Chem. 203 B f. The Polyene Pigments, and Certain Vitamins (2)**—Two lectures.

A study of the structure and reactions of the more important polyene pigments and those vitamins whose structures are known.

Drake.

**Chem. 203 C f. Sterols and Sex Hormones (2)**—Two lectures. (Not offered in 1941-1942.)

A study of the structure and reactions of the more important sterols, and the sex hormones.

Drake.

**Chem. 205 f or s. Organic Preparations (2-4)**—Two or four laboratories.

A laboratory study of the synthesis of various organic compounds and of the quantitative methods of determining carbon and hydrogen, nitrogen, and halogen in organic compounds.

Reeve.

**Chem. 206 f or s. Organic Microanalysis (4).** Prerequisite, consent of the instructor.

A laboratory study of the methods of Pregl for the quantitative determination of halogen, nitrogen, carbon and hydrogen, and methoxyl.

Drake.

**Chem. 207 f or s. Organic Qualitative Analysis (2-6).**

Laboratory work devoted to the identification of pure organic substances and of mixtures. This course serves as an intensive preparation for the problems of identification encountered in organic research, and should be taken by all students planning to do research in organic chemistry.

Reeve.

**Chem. 210 f or s. Advanced Organic Laboratory (2-3)**—Two or three laboratories. Prerequisites, Chem. 205 and 207 or their equivalent.

A laboratory course designed to fit the needs of a student about to begin research in organic chemistry. The course consists of work on the identification of mixtures of organic compounds, difficult syntheses and ultimate analyses for carbon and hydrogen, nitrogen, and halogen, but can be varied to fit the needs of the individual student.

Reeve.

**Chem. 235 A s. Chemistry of Certain Nitrogen Compounds (2)**—Two lectures.

A study of the chemistry of open chain nitrogen compounds and of alkaloids.

Reeve.

**Chem. 235 B s. Physical Aspect of Organic Chemistry (2)**—Two lectures. (Not offered in 1941-1942.)



The practical applications of modern theories of physics and physical chemistry to the problems of structure and reactions of organic substances. Reeve.

**Chem. 235 C s. The Heterocyclics (2)**—Two lectures. (Not offered in 1941-1942.)

A study of some of the heterocyclic compounds with special reference to those related to natural products. Reeve.

#### D. Physical Chemistry

##### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Chem. 102 A y. Physical Chemistry (6)**—Three lectures. Prerequisites, Chem. 6 y, Phys. 2 y, Math. 23 y. Graduate students will elect Chem. 231 f and 232 s.

This course aims to furnish the student with a thorough background in the laws of theories of chemistry. The gas laws, kinetic theory, liquids, solutions, elementary thermodynamics, thermochemistry, equilibrium, chemical kinetics, etc., will be discussed. Haring.

**Chem. 103 A y. Elements of Physical Chemistry (4)**—Two lectures. Prerequisites, Chem. 1 y, Phys. 1 y, Math. 8 f and 10 s or 21 f and 22 s.

The course is designed to meet the needs of premedical students and others unable to pursue the subject further. Accordingly such topics as solution theory, colloid chemistry, reaction rates, equilibrium, the methods of determining pH, etc., are stressed. Lamb.

**Chem. 103 B y. Elements of Physical Chemistry Laboratory (2)**—One laboratory. Prerequisite, Chem. 4 f or s.

Numerous quantitative experiments illustrating the principles discussed in Chem. 103 A y are performed. Lamb.

**Chem. 105 y. Elements of Chemical Thermodynamics (4)**—Two lectures. Prerequisite, Chem. 102 A y.

This course is designed for Chemical Engineering majors and is less extensive than Chem. 226 y but with suitable emphasis on all pertinent topics. Haring.

##### COURSES FOR GRADUATES

**NOTE:** All courses in this group have as prerequisites Chem. 102 A y for lecture courses and Chem. 102 B y for laboratory courses, or their equivalent.

**Chem. 212 A f, 213 A s. Colloid Chemistry (2, 2)**—Two lectures.

A discussion of the effects of surface on chemical reactions; numerous practical applications. Haring.

**Chem. 212 B f, 213 B s. Colloid Chemistry Laboratory (2, 2)**—Two laboratories, which must accompany or be preceded by Chem. 212 A f, 213 A s. Haring.

**Chem. 214 f, 215 s. Structure of Matter (2, 2)**—Two lectures.

A study of the structure of atoms, molecules, solids and liquids. Molecular structure and related topics will be studied from the standpoints of dipole moments, Raman spectra, and infra-red spectra. Lamb.

**Chem. 216 f. Phase Rule (2)**—Two lectures. (Not given in 1941-1942.)

A systematic study of heterogeneous equilibria. One, two, and three component systems will be considered, with practical applications of each. Haring.

**Chem. 217 s. Catalysis (2)**—Two lectures. (Not given in 1941-1942.)

This course consists of lectures on the theory and applications of catalysis. Haring.

**Chem. 218 f, 219 s. Reaction Kinetics (2, 2)**—Two lectures. (Not given in 1941-1942.)

A study of reaction velocity and mechanisms of reactions in gaseous and liquid systems, and the effect of temperature, radiation, etc., on the same. Lamb.

**Chem. 220 A f, 221 A s. Electrochemistry (2, 2)**—Two lectures. (Not given in 1941-1942.)

A theoretical discussion coupled with practical applications. Haring.

**Chem. 220 B f, 221 B s. Electrochemistry Laboratory (2, 2)**—Two laboratories, which must accompany or be preceded by Chem. 220 A f, 221 A s. (Not given in 1941-1942.) Haring.

**Chem. 226 y. Chemical Thermodynamics (4)**—Two lectures.

A study of the methods of approaching chemical problems through the laws of energy. Haring.

**Chem. 231 f, 232 s. Physical Chemistry Laboratory (2 or 3, 2 or 3)**—Two laboratories and one conference.

Students taking this course may elect six credits of lectures in Chem. 102 A y to replace the conference. Lamb.

**Chem. 202 y. Theory of Solutions (4)**—Two lectures. Prerequisite, Chem. 102 A y.

A systematic study of the theories and properties of solutions. Subjects considered are solubility, regular solutions, dipole moments, solution kinetics, and modern theories of dilute and concentrated electrolytes. Svirbely.

### E. Biological Chemistry

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Chem. 108 f or s. General Physiological Chemistry (4)**—Two lectures; two laboratories. Prerequisites, Chem. 12 A y and 12 B y, or their equivalent.

This course is a study of the fundamental principles of human nutrition, the chemistry of foods, digestion, absorption, assimilation, metabolism, tissue composition and excretion. The laboratory work consists of experiments in food analysis, salivary, gastric, pancreatic and intestinal digestion, and identification of components of blood and urine. Supplee.

**Chem. 115 y. Food Analysis (4)**—Two laboratories. (One hour per week is devoted to a regularly scheduled laboratory conference which must be attended by all students taking the course.) By special arrangement a student may take this course one semester for two credits. Prerequisites, Chem. 12 A y, 12 B y, 4 f, or equivalent.

This course is designed to give the student experience in analytical procedures of particular benefit to workers in the food industries. Particular attention is given to the problems presented in sampling, and in applying standard methods to different types of products. Instrumental analysis is stressed. Wiley.

#### COURSES FOR GRADUATES

**Chem. 208 f or s. Biological Analysis (2)**—Two laboratories.

A course in analytical methods of value to the student whose major field is in the biological sciences. The work is varied somewhat to fit the needs or interest of the individual student. Wiley.

**Chem. 222 A f, 223 A s. Physiological Chemistry (2, 2)**—Two lectures. Prerequisites, Chem. 12 A y and 12 B y, or their equivalent.

An advanced course in physiological chemistry. For the first semester the course consists of lectures and assigned reading on the chemistry of the carbohydrates, fats, proteins and enzymes. The second semester deals with digestion, absorption, metabolism, excretion, hormones and nutrition. Supplee.

**Chem. 222 B f, 223 B s. Physiological Chemistry Laboratory (2, 2)**—Two laboratories. Prerequisites, Chem. 4 f or s and 12 A y and 12 B y, or their equivalent.

A laboratory course to accompany Chem. 222 A f and 223 A s. Qualitative and quantitative food analysis; digestion, nutrition, metabolism, and respiration experiments; quantitative analysis of the blood and urine. Supplee.

**Chem. 224 f, 225 s. Special Problems (2-4, 2-4)**—Laboratory, library, and conference work amounting to a minimum of 10 hours a week. Prerequisites, Chem. 222 A f and 223 A s, and consent of the instructor.

This course consists of studies of special methods, such as the separation of the fatty acids from a selected fat, the preparation of carbo-

hydrates or amino acids, the determination of the distribution of nitrogen in a protein or the detailed analysis of some specific type of tissue. The student will choose the particular problem to be studied with the advice of the instructor. Wiley.

### F. History of Chemistry

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Chem. 121 y. The History of Chemistry (2)**—One lecture. Prerequisites, Chem. 1 y and Chem. 8 y, or their equivalent.

The development of chemical knowledge, and especially of the general doctrines of chemistry, from the earliest beginnings up to the present day. Broughton.

### G. Seminar and Research

#### COURSES FOR GRADUATES

**Chem. 227 f, 228 s. Seminar (1, 1).** Required of all graduate students in chemistry.

Students are required to prepare reports on papers in the current literature. These are discussed in connection with the recent advances in the subject. Staff.

**Chem. 229. Research in Chemistry.** The investigation of special problems and the preparation of a thesis towards an advanced degree. Staff.

## CLASSICAL LANGUAGES

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Latin 131 f. Tacitus, Annals and Germania (3)**—Three lectures. Prerequisite, 12 hours beyond Latin 2 y. (Not given in 1941-1942.) Highby.

**Latin 132 s. Martial, Selected Epigrams (3)**—Three lectures. Prerequisite, 12 hours beyond Latin 2 y. Highby.

**Latin 141 f. Lucretius, De Natura Rerum (3)**—Three lectures. Prerequisite, 12 hours beyond Latin 2 y. Highby.

**Latin 151 s. Advanced Latin Prose Composition (3)**—Three lectures. Prerequisite, 9 hours beyond Latin 2 y. (Not given in 1941-1942.) Highby.

## COMPARATIVE LITERATURE

A general prerequisite for all courses in Comparative Literature is English 1 y and English 2 f and 3 s. Requirements for a major include Comparative Literature 101 f and 102 s.

## COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Comp. Lit. 101 f. Introductory Survey of Comparative Literature (3)**—Three lectures.

Survey of the background of European literature through study in English translations of Greek and Latin literature. Special emphasis is laid on Greek drama along with the development of the epic, tragedy, comedy, and other typical forms of literary expression. The debt of modern literature to the ancients is discussed and illustrated. Zucker.

**Comp. Lit. 102 s. Introductory Survey of Comparative Literature (3)**—Three lectures.

Continuation of Comp. Lit. 101 f; study of medieval and modern Continental literature. Zucker.

**Comp. Lit. 103 f. Chaucer (3)**—Three lectures. (Same as English 104 f.) Hale.

**Comp. Lit. 104 s. The Old Testament as Literature (2)**—Two lectures. A study of the sources, development, and literary types. Hale.

**Comp. Lit. 105 f. Romanticism in France (2)**—Two lectures.

Lectures and readings in the French romantic writers from Rousseau to Baudelaire. Texts are read in English translations. Wilcox.

**Comp. Lit. 106 s. Romanticism in Germany (2)**—Two lectures.

Continuation of Comp. Lit. 105 f. German literature from Buerger to Heine. The reading is done in English translations. Prahl.

**Comp. Lit. 107 f. The Faust Legend in English and German Literature (2)**—Two lectures.

A study of the Faust legend of the Middle Ages and its later treatment by Marlowe in *Dr. Faustus* and by Goethe in *Faust*. Prahl.

**Comp. Lit. 108 f. Milton (2)**—Two lectures. (Same as English 108 f.) Murphy.

**Comp. Lit. 109 y. Cervantes (6)**—Three lectures. (Same as Spanish 105 y.) Darby.

**Comp. Lit. 110 s. Introduction to Folklore (2)**—Two lectures.

Origin, evolution, and bibliography of types. Literary significance, as seen in the development of prose fiction. Collections, such as the Panchatantra, Seven Sages, Arabian Nights, etc., and the continuation of these tales through medieval and modern literature. Robertson.

**Comp. Lit. 111 s. A study of Literary Criticism (3)**—Three lectures. A survey of the major schools of criticism from Plato to the present day. Murphy.



Comp. Lit. 112 f. Ibsen (2)—Two lectures.

A study of the life and chief works of Ibsen with special emphasis on his influence on the modern drama. Zucker.

Comp. Lit. 113 f, 114 s. Prose and Poetry of the Romantic Age (3, 3)—Three lectures. (Same as English 113 f, 114 s.) Hale.

Comp. Lit. 124 s. Contemporary Drama (3)—Three lectures. (Same as English 124 s.) Fitzhugh.

Comp. Lit. 125 f. Emerson, Thoreau, and Whitman (3)—Three lectures. (Same as English 125 f.) Warfel.

#### COURSES FOR GRADUATES

Comp. Lit. 200 s. The History of the Theatre (2)—Two lectures. Prerequisite, a wide acquaintance with modern drama and some knowledge of the Greek drama. (Not given in 1941-1942.)

A detailed study of the history of the European theatre. Individual research problems will be assigned for term papers. Hale.

Comp. Lit. 201 y. Medieval Romance in England (4)—Two lectures. (Same as English 204 y.) Hale.

Comp. Lit. 203 y. Schiller (4)—Two lectures. (Same as German 203 y.) Prahl.

Comp. Lit. 204 y. Goethe (4)—Two lectures. (Same as German 204 f and 205 s.) Zucker.

Comp. Lit. 205 y. Georges Duhamel, Poet, Dramatist, Novelist (4)—Two lectures. (Same as French 204 y.) (Not given in 1941-1942.) Falls.

Comp. Lit. 207 f. Seminar in Shakespeare (2)—Two lectures. Prerequisites, English 11 f and English 12 s. (Same as English 207 f.) Zeeveld.

#### DAIRY HUSBANDRY

##### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

D. H. 101 f. Dairy Production (3)—Two lectures; one laboratory. Prerequisites, D. H. 1 s and A. H. 102 f.

A comprehensive course in dairy cattle feeding and herd management designed for advanced students in dairy husbandry. It covers the efficient feeding of the dairy herd, including milking cows, dairy heifers, calves and dairy bulls; common diseases of dairy cattle and their treatment; dairy farm sanitation; problems of herd management; dairy barns and equipment; and the factors essential for success in the dairy farm business. Turk.



**D. H. 104 f. Advanced Dairy Cattle Judging (1)**—One laboratory. Prerequisite, D. H. 50 s.

Advanced work in selection and judging dairy cattle. Credit only to students who do satisfactory work in competition for the dairy cattle judging team. Turk.

**D. H. 105 s. Dairy Breeds and Breeding (2)**—One lecture; one laboratory. Prerequisites, D. H. 1 s, Zool. 104 f, A. H. 103 s.

A study of the historical background; characteristics; prominent blood lines, noted families and individuals of the major dairy breeds. A survey of breeding systems; genetics and environmental factors as applied to dairy cattle. The use of the pedigree, various indices, herd and production records in selection and formulating breeding programs. Berry.

**D. H. 106 f. Dairy Cattle Management (2)**—Two laboratories. Prerequisite, D. H. 1 s.

A management course designed to familiarize students with the practical handling and management of dairy cattle. Students are given actual practice and training in the University dairy barns.

**D. H. 109 f. Cheese Making (3)**—One lecture; two laboratories. Prerequisites, D. H. 1 s and Bact. 1.

The principles and practice of making casein and cheese, including a study of the physical, chemical, and biological factors involved. Laboratory practice will include visits to commercial factories. Hughes.

**D. H. 110 f. Butter Making (2)**—One lecture; one laboratory. Prerequisites, D. H. 1 s and Bact. 1.

The principles and practice of making butter, including a study of the physical, chemical, and biological factors involved. Laboratory practice will include visits to commercial factories. England.

**D. H. 111 s. Concentrated Milks (2)**—One lecture; one laboratory. Prerequisites, D. H. 1 s and Bact. 1.

The principles and practice of making condensed milk, evaporated milk, and milk powder, including a study of the physical, chemical, and biological factors involved. Laboratory practice will include visits to commercial factories. England.

**D. H. 112 s. Ice Cream Making (3)**—One lecture; two laboratories. Prerequisites, D. H. 1 s and Bact. 1.

The principles and practice of making ice cream, sherbets, and ices, including a study of the physical, chemical, and biological factors involved. Laboratory practice will include visits to commercial factories. England.

**D. H. 113 f. Market Milk (5)**—Three lectures; two laboratories. Prerequisites, D. H. 1 s and Bact. 1. (Not given in 1941-1942.)

Commercial and economic phases of market milk, with special reference to its transportation, processing, and distribution; certified milk; commercial buttermilk; milk laws; duties of milk inspectors; distribution; milk plant construction and operation. Laboratory practice includes visits to local dairies. England.

**D. H. 114 s. Analysis of Dairy Products (4)**—Two lectures; two laboratories. Prerequisites, D. H. 1 s, Bact. 1, Chem. 4 and 12 y. (Not given in 1941-1942.)

The application of chemical and bacteriological methods to commercial dairy practice; analysis by standard chemical, bacteriological, and factory methods; standardization and composition control; tests for adulterants and preservatives. England.

**D. H. 116 s. Dairy Mechanics (2)**—Two laboratories. Prerequisite, D. H. 1 s. (Not given in 1941-1942.)

The theory and operation of the compression system of mechanical refrigeration. Construction, design, and care of dairy equipment, repairing, soldering, pipe fitting, and wiring. Hughes.

**D. H. 117 s. Dairy Accounting (1)**—One laboratory. Prerequisite, D. H. 1 s. (Not given in 1941-1942.)

Methods of accounting in the market milk plant and dairy manufacturing plants. Hughes.

**D. H. 119 f, 120 s. Dairy Literature (1, 1)**—One lecture. Prerequisite, D. H. 1 s.

Presentation and discussion of current literature in dairying. England, Barry, Turk.

**D. H. 123 f, 124 s. Methods of Dairy Research (1-3).** Credit in accordance with the amount and character of work done.

This course is designed especially to meet the needs of those dairy students who plan to enter the research or technical field of dairying. Methods of conducting dairy research and the presentation of results are stressed. A research problem which relates specifically to the work the student is pursuing will be assigned.

#### COURSES FOR GRADUATES

**D. H. 201 f. Advanced Dairy Production (3).**

A study of the newer discoveries in dairy nutrition, physiology, breeding and management. Turk.

**D. H. 202 f. Dairy Technology (2)**—Two lectures.

A consideration of milk and dairy products from the physiochemical point of view. England.

**D. H. 203 s. Milk Products (2)—Two lectures.**

An advanced consideration of the scientific and technical aspects of milk products. England.

**D. H. 204 f or s. Special Problems in Dairying (1-3).** Credit in accordance with the amount and character of work done.

Special problems which relate specifically to the work the student is pursuing will be assigned. Staff.

**D. H. 205 f or s. Seminar (1).**

Students are required to prepare reports on current literature in dairy husbandry and allied fields. These reports are presented and discussed in the class. Staff.

**D. H. 206. Research.** Credit to be determined by the amount and quality of work done.

The student will be required to pursue, with the approval of the head of the department, an original investigation in some phase of dairy husbandry. Staff.

**ECONOMICS**

See also related courses in Business Administration and in Agricultural Economics.

**COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES**

**Econ. 129 s. (Fin. 129 s). International Finance (3).** Prerequisite, Econ. 51 y or 57. Open to majors in Business Administration only as Fin. 129 s.

Class sessions with Finance 129 s but readings and reports stress the economic as contrasted with the managerial and business men's viewpoint. Assumed previous knowledge of finance is less than in Finance 129 s. Gay.

**Econ. 130 f. Labor Economics (3).** Prerequisite, Econ. 51 y or 57.

Insecurity, wages and income, hours, substandard workers, industrial conflict; wage theories; the economics of collective bargaining; unionism in its structural and functional aspects; recent developments. Marshall.

**Econ. 131 s. Labor and Government (3).** Prerequisite, Econ. 51 y or 57.

A study of society's efforts through legislation to improve labor conditions. State and federal laws and court decisions affecting wages, hours, working conditions, immigration, convict labor, union activities, industrial disputes, collective bargaining, and economic security. Marshall.

**Econ. 133 f. Industrial Relations (3).** Prerequisite, Econ. 51 y.

A study of the development and methods of organized groups in industry with reference to the settlement of labor disputes. An economic and legal

analysis of labor union and employer association activities, arbitration, mediation, and conciliation; collective bargaining, trade agreements, strikes, boycotts, lockouts, company unions, employee representation, and injunctions. Marshall.

**Econ. 136 s. Economics of Consumption (3).** Prerequisite, Econ. 51 y or 57.

The place of the consumer in our economic system; an analysis of demand for consumer goods; the need for consumer-consciousness and a technique of consumption; cooperative and governmental agencies for consumers. Special problems. Marshall.

**Econ. 145 s. Public Service Industries (3).** Prerequisite, Econ. 51 y or 57.

Economic and legal characteristics of the public utility status; problems of organization, production, marketing, and finance; public regulation and alternatives. Wyckoff.

**Econ. 151 f. Comparative Economic Systems (3).** Prerequisite, Econ. 51 y.

An investigation of some of the more important social reform movements and programs of the modern era. The course begins with an examination and evaluation of the capitalistic system, followed by an analysis of alternative types of economic control. Marshall.

**Econ. 152 s. Social Control of Business (3).** Prerequisite, sophomore economics.

The reasons for, and the methods of avoidance, escape, and abuse of competition as a regulating force in business; social control as a substitute for, or as a modification of, preservation of competition; law as an instrument of social control through administrative law and tribunals; the constitutional aspects of social control. Shirley.

**Econ. 153 f. Industrial Combinations (3).** Prerequisite, Econ. 51 y.

The development of industrial combinations in the United States; the causes which brought about the trust movement; trade and business methods employed by these combinations; types of big business; anti-trust legislation in this country and its effects. Wyckoff.

**Econ. 161 f. Economics of Cooperative Organization (3).** Prerequisite, Econ. 51 or 57.

Analysis of the principles and practice of cooperation in economic activity from the viewpoint of effective management and public interest. Potentialities, limitations, and management problems of consumer, producer, marketing, financial, and business men's cooperatives.

Stevens, Clark.

**Econ. 191 s. Contemporary Economic Theory (3).**

A survey of recent trends in English, American and continental economic thought with special attention paid to the institutionalists, the welfare economists, and the mathematical economists. Gruchy.

**Econ. 195 f, 196 s. Special Problems in Economics (3).** Prerequisite, preliminary courses in Economics and in the field of specialized study, high scholastic standing, and consent of the instructor.

Independent study of economic problems in a specialized field. The method of individual conferences and reports. For students of initiative, resourcefulness, maturity, and high scholastic standing who wish to do extensive organized reading in a special field of Economics.

Stevens and staff.

**COURSES FOR GRADUATES**

**Econ. 201. Research.** Credit in proportion to work accomplished. Students must be especially qualified to pursue effectively the research to be undertaken. Staff.

**Econ. 203 y. Seminar (4-6).** Prerequisite, concurrent graduate major in economics or business administration, and consent of instructor.

Discussion of major problems in the field of economic theory, accounting, cooperation, or business. Staff.

**Econ. 205 f. History of Economic Thought (3).**

A study of the development of economic thought and theories, including the Ancients, the Greeks, the Romans, Scholasticism, Mercantilism, Physiocrats, Adam Smith and contemporaries, Malthus, Ricardo, and John Stuart Mill. Marshall.

**Econ. 206 s. Economic Theory in the Nineteenth Century (3).**

A study of the various schools of economic thought, particularly the classicists, the neo-classicists, the Austrians, and the socialists. Marshall.

**Econ. 210 f and s. Special Problems in Economic Investigation (1-3 each semester).** Credit in proportion to work accomplished.

Technique involved in economic research. Practice in drawing up schedules and programs. Individual conferences and reports.

**Econ. 233 s. Problems in Industrial Relations (3).** Prerequisites, preliminary courses in the field of specialization, and permission of the instructor. The subjects selected for study may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis. Marshall.

**Econ. 252 s. Problems in Government and Business Interrelations (3).** Prerequisites, preliminary courses in the field of specialization, and permission of the instructor. The subjects selected for study may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis. Shirley.



Econ. 299 f and s. Problems in Economics of Cooperation (1-3 each semester). Prerequisites, six semester hours in accounting, three in finance, three in statistics, eight in economics and three in cooperative theory. Problems may involve practical work with the National Cooperative Council and other Washington, D. C., or Maryland cooperative organizations. The subjects selected for investigation may be closely allied with, but must not be the same as, the subject discussed in the student's major thesis. Stevens.

## EDUCATION

### Special Departmental Requirements, in Addition to the General Requirements of the Graduate School.

#### MASTER OF ARTS AND MASTER OF EDUCATION

A qualifying written examination is required of all candidates for a degree, to be taken after the student has successfully completed ten hours of graduate work, and at least four calendar months before the student expects to receive the degree. This examination covers the general information students should have in the field of education. To assist in a choice of reading in preparation for the examination a list has been prepared and is available in the office of the College of Education.

In addition to the general requirements for admission, applicants for unconditional admission to the Graduate School to pursue major work in Education must have had sixteen semester hours of undergraduate work in Education, of acceptable quality and equivalent in character to the sixteen hours required in the junior and senior years of the University of Maryland.

#### DOCTOR OF PHILOSOPHY

The Department of Education offers work towards the degree of Doctor of Philosophy with major or minor in the following fields:

- a. General Education: includes history of education, comparative education, educational sociology, secondary education, elementary education, and adult education.
- b. Educational Administration: includes organization and administration of elementary, secondary, and higher education; school finance, business administration of schools; and supervision of elementary and secondary schools.
- c. Curriculum and Instruction: includes principles of curriculum making, special methods and curricula in various fields, guidance, and research studies in the teaching of special subjects.

In addition to the general university requirements for the degree the following additional requirements must be met by students proposing to major in one of the above fields:



1. Qualifying examination, oral or written, or both, at the discretion of the department, covering student's undergraduate and first year of graduate preparation in education and related fields, to be taken as soon as possible after completion of the first year of graduate work and in any event required before receiving the department's official permission to take work beyond the Master's degree with the purpose of applying for candidacy for the doctorate.

2. The preliminary examination for admission to candidacy for the Ph.D. degree will include a written examination covering the student's preparation in major and minor fields, and an oral examination covering his plan of research for the doctoral dissertation.

### A. History and Principles

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

##### **Ed. 100 f. History of Education in the United States (2).**

A study of the origins and development of the chief features of the present system of education in the United States. Wiggin.

##### **Ed. 102 s. History of Modern Education (2).**

A survey of the history of education with emphasis upon the modern period in Europe. Long.

##### **Ed. 103 s. The High School (2).**

The secondary school population, its nature and needs; the school as an instrument of society; relation of the secondary school to other schools; aims of secondary education; curriculum and methods in relation to aims; extra-curricular activities; guidance and placement; the school's opportunities for service to its community; teacher certification and employment in Maryland and the District of Columbia. Brechtbill.

**Ed. 105 f. Educational Measurements (2).** Prerequisite, consent of instructor.

A study of tests and examinations with emphasis upon their construction and use. Types of tests; purposes of testing; elementary statistical concepts, and processes used in summarizing and analyzing test results; school marks. Brechtbill.

##### **Ed. 107 f. Comparative Education (2).**

A study of national systems of education with the primary purpose of discovering their characteristic differences and formulating criteria for judging their worth. Emphasis upon European systems. Long.

##### **Ed. 108 s. Comparative Education (2).**

This course is a continuation of Ed. 107 with emphasis upon the national education systems of the Western Hemisphere. Benjamin.

**Ed. 110 f. The Junior High School (2).**

This course is designed to give a general overview of education in the junior high school. It includes material on the purposes, functions, and characteristics of this school unit, and a study of its population, organization, program of studies, methods, staff, and other similar topics, together with their implication for prospective teachers. Joyal.

**Ed. 112 f. Educational Sociology—Introductory (2).**

This course deals with certain considerations as derived from the data of the social sciences which are germane to the work of teachers and school administrators. Prominent among those treated are the following: democratic ideology as the value benchmark for all educational endeavor; educational tasks imposed by population and technological trends; the distribution of welfare and its educational consequences; the welfare status of the school population and the consequent demands made upon the school; the selective character of the school in welfare terms and the educational implications of this class structuring; the socio-economic composition and attitudes of school board members, school administrators and teachers, and the limiting conditions which these impose upon the work of the school; the problem of securing academic freedom in the schools; the community approach to education. Hand.

**Ed. 114 s. Guidance in the Schools (3).**

This course is primarily designed for the classroom teacher in terms of the day-by-day demands made upon him as a teacher in the guidance of the youth in his classes and in the extra-class activities which he sponsors. The stress throughout will be upon practical common-sense guidance procedures of demonstrated workability. A variety of practical use-materials helpful in the guidance of youth will be examined. Hand.

See also *Agricultural Education and Rural Life*.

**COURSES FOR GRADUATES****Ed. 200 f. The Organization and Administration of Public Education (2).**

This course deals with so-called "external" phases of school administration. It includes study of the present status of public school administration, organization of local, state, and federal education authorities, and the administrative relationships involved therein. Joyal.

**Ed. 202 s. The Organization, Administration, and Supervision of Secondary Schools (2).**

This course is designed as a continuation of Ed. 200, but may be taken independently. It includes what is called "internal" administration; the organization of units within a school system, the personnel problems involved, and such topics as schedule making, teacher selection, public relations, and school supervision. Joyal.

**Ed. 203 s. High School Supervision (2).**

This course will deal with the nature and functions of supervision in a modern school program; recent trends in supervisory theory and practice;

teacher participation in the determination of policies; planning of supervisory programs; appraisal of teaching methods; curriculum reorganization and other direct and indirect means for the improvement of instruction. Joyal.

**Ed. 212 s. Educational Sociology—Advanced (2).**

This course is essentially a continuation of Ed. 112 f in that it is designed further to round out the study of various considerations derived from the data of the social sciences which are pertinent to the work of all public school educators. However, Ed. 112 f is not required as a prerequisite.

The educational implications of such topics as the following are studied: role of an ideology, national defense crisis, status of civil liberties, depletion status of natural resources, folklore of education, interest and pressure groups, press, radio, pictures, economic myths, behavior of electorate, youth problems, consumer behavior, recreational trends, occupational trends, safety, teachers' organizations, and follow-up studies. Hand.

**Ed. 216 s. School Finance and Business Administration (2).**

This course deals principally with these topics: school revenue and taxation; federal and state aid and equalization; purchase of supplies and equipment; internal school accounting; and other selected problems of local school finance. Joyal.

Students qualifying for the degree of Master of Education will elect the required four semester hours of seminar work from the following list of seminars (Ed. 220-Ed. 234, inclusive). These courses are open for election by any other graduate student.

Ed. 220 f. Seminar in Secondary Education (2). Hand.

Ed. 222 f. Seminar in Adult Education (2). Benjamin.

Ed. 224 s. Seminar in History of Education (2). Long.

Ed. 226 f. Seminar in Administration (2). Joyal.

Ed. 228 s. Seminar in Special Education (2). Cain.

Ed. 230 f. Seminar in Science Education (2). Brechbill.

Ed. 232 s. Seminar in Guidance (2). Hand.

Ed. 234 s. Seminar in Comparative Education (2). Benjamin.

**Ed. B 236 f or s. Seminar in Vocational Education (2),** commonly given in the summer session and in the Baltimore division, may be used to satisfy this requirement.

Ed. Psych. 210 y. Seminar in Educational Psychology (6) may also be used to satisfy this requirement.

Phys. Ed. 201 f or s. Problems of Health and Physical Education (3) may also be used to satisfy this requirement.

### B. Educational Psychology

For full descriptions of these courses, see Psychology, p. 100.

Psych. 110 f or s. Advanced Educational Psychology (3).

Psych. 125 f. Child Psychology (3).

Psych. 130 f or s. Mental Hygiene (3).

Psych. 210 y. Seminar in Educational Psychology (6).

### C. Methods in High School Subjects

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

Graduate credit for courses in this section will be given only by special permission of the Department of Education and the Graduate School.

Ed. 120 s. Curriculum, Instruction, and Observation—English (3).  
Prerequisite, Psych. 10.

Objectives in English in the different types of high schools; selection and organization of subject matter in terms of modern practice and group needs; evaluation of texts and references; bibliographies; methods of procedure and types of lessons; the use of auxiliary materials; lessons plans; measuring results. Twenty periods of observation. Smith.

Ed. 122 s. Curriculum, Instruction, and Observation—Social Studies (3).  
Prerequisite, Psych. 10.

Objectives and present trends in the social studies; texts and bibliographies; methods of procedure and types of lessons; the use of auxiliary materials; lesson plans; measuring results. Twenty periods of observation.

Ed. 124 s. Curriculum, Instruction, and Observation—Foreign Language (3). Prerequisite, Psych. 10.

Objectives of foreign language teaching in the high school; selection and organization of subject matter in relation to modern practice and group needs; evaluation of texts and references; bibliographies; methods of procedure and types of lessons; lesson plans; special devices; measuring results. Twenty periods of observation.

**Ed. 126 s. Curriculum, Instruction, and Observation—Science (3).** Prerequisite, Psych. 10.

Objectives of science teaching, their relation to the general objectives of secondary education; application of the principles of psychology and of teaching to the science class-room situation; selection and organization of subject matter; history, trends, and status; textbooks, reference works, and laboratory equipment; technic of class room and laboratory; measurement, standardized tests; professional organizations and literature. Twenty periods of observation. Brechbill.

**Ed. 128 s. Curriculum, Instruction, and Observation—Mathematics (3).** Prerequisite, Psych. 10.

Objectives; the place of mathematics in secondary education; content and construction of courses; recent trends; textbooks and equipment; methods of instruction; measurement and standardized tests; professional organizations and literature. Twenty periods of observation. Brechbill.

**Note:** See also H. E. Ed. 103 f or s. Teaching Secondary Vocational Home Economics; Ind. Ed. 162 s, Curriculum, Instruction, and Observation—Industrial Education; Ed. 142 f. Curriculum, Instruction, and Observation—Physical Education.

**Ed. 138 f. Visual Education (2).**

Visual impressions in their relation to learning; investigations into the effectiveness of instruction by visual means; projection apparatus, its cost and operation; slides, film strips, and films; physical principles underlying projection; the integration of visual materials with organized courses of study; means of utilizing commercial moving pictures as an aid in realizing the aims of the school. Brechbill.

## D. Commercial Education

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Ed. 150 f, 151 s. Curriculum, Instruction, and Observation—Commercial Subjects (2, 2).** Prerequisite, Psych. 10.

Aims and methods for the teaching of shorthand, typewriting, and bookkeeping in high schools. Twenty periods of observation.

## E. Home Economics Education

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**H. E. Ed. 101 s. Curriculum, Instruction, and Observation—Home Economics (3).** Prerequisite, Psych. 10.

Philosophy of homemaking education; community surveys; analysis of characteristics, interests, and needs of the high school girl; selection of illustrative material; the home project. McNaughton.

**H. E. Ed. 105 f or s. Special Problems, Child Study (4).** McNaughton.



## COURSES FOR GRADUATES

**H. E. Ed. 201 f or s. Advanced Methods of Teaching Home Economics (2-4).**

Study of social trends as applied to the teaching of home economics.  
McNaughton.

**H. E. Ed. 250 y. Seminar in Home Economics Education (2-4).**

McNaughton.

## F. Industrial Education

## COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Ind. Ed. 160 y. Essentials of Design (2).** Prerequisites, Ind. Ed. 1 f, 2 s, or equivalent.

A study of the basic principles of design and practice in their application to the construction of high school shop projects. It presents knowledge and develops abilities in the art elements of line, mass, color, and design, and employs laboratory activities in freehand and mechanical drawing, tracing, and blue-printing.  
Gallington.

**Ind. Ed. 162 s. Curriculum, Instruction, and Observation—Industrial Education (3).** Prerequisite, Psych. 10.

Major functions and specific aims of industrial education; their relation to the general objectives of the junior and senior high schools; selection and organization of subject matter in terms of modern practices and needs; methods of instruction; expected outcomes; measuring results; professional standards. Twenty periods of observation.

Brown, Gallington.

**Ind. Ed. 164 s. Shop Organization and Management (2).**

This course recapitulates methods of organization and management for teaching shop subjects. It includes organization and management of pupils; daily programs; projects; pupils' progress charts; selection, location, and care of tools, machines, equipment, and supplies; records and reports; and good school housekeeping. Opportunity is provided for visits to industrial plants as a basis for more practical planning of shop instruction and management.  
Brown.

**Ind. Ed. 167 y. General Shop (4).**

A general survey course designed to meet teacher training needs in organizing and administering a high school General Shop course. Special teaching methods are emphasized as students are rotated through skill and knowledge developing activities in mechanical drawing, electricity, woodworking, and general metal working.  
Gallington.

For courses offered in Baltimore, consult the "Department of Industrial Education Announcement of Baltimore Education Courses" issued in August, 1941. Address Professor Glen D. Brown, Department of Industrial Education, University of Maryland, Lombard and Greene Streets, Baltimore, Maryland.



### G. Physical Education

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Ed. 142 f. Curriculum, Instruction, and Observation—Physical Education (3).** Prerequisite, Psych. 10.

Materials and procedures in relation to program planning, physical examinations, records, grading, directed observation, reports, conferences and criticisms. Twenty periods of observation.

#### COURSES FOR GRADUATES

**Phys. Ed. 201 f or s. Problems of Health and Physical Education (3).**

This course is designed to aid in solving the multitude of problems that arise in the administration of health and physical education in public schools. An attempt will be made to set up standards for evaluating the effectiveness of programs of health and physical education.

## ENGINEERING

### A. Chemical Engineering

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Ch. E. 103 y. Elements of Chemical Engineering (6)**—Three lectures. Prerequisites, Chem. 8 A y and 8 B y, Phys. 2 y.

Theoretical discussion of general underlying philosophy and methods in chemical engineering, such as presentation of data, material balances, and heat balances. Illustrated by consideration of typical unit operations, including problems.

**Ch. E. 104 y. Chemical Engineering Seminar (2).**

Students prepare reports on current problems in chemical engineering and participate in the discussion of such reports.

**Ch. E. 105 y. Advanced Unit Operations (10)**—Two lectures, three laboratories. Prerequisites, Ch. E. 103 y and Chem. 102 A y.

Advanced theoretical treatment of fluid flow, heat flow, evaporation, humidity, distillation, absorption, scrubbing, and analogous unit operations typical of chemical engineering. Problems and laboratory operation of small scale semi-commercial type equipment. A comprehensive problem involving theory and laboratory operations is included to illustrate the development of a plant design problem that requires the utilization of a number of the fundamental topics.

**Ch. E. 106 y. Minor Problems (13).** Prerequisite, permission of Department of Chemical Engineering. Completion of, or simultaneous registration in, Ch. E. 105 y will ordinarily be required. (Not given in 1941-1942.)

Original work on a special problem assigned to each student, including preparation of a complete report covering the study.

**Ch. E. 107 y. Fuels and their Utilization (4)**—Two lectures. Prerequisite, registration in Ch. E. 103 y or permission of Department of Chemical Engineering.

A study of the sources of solid, liquid, and gaseous fuels, their economic conversion, distribution, and utilization. Problems. Huff.

**Ch. E. 108 y. Chemical Technology (4)**—Two lectures. Prerequisite, registration in Ch. E. 103 y or permission of Department of Chemical Engineering.

A study of the principal chemical industries. Plant inspections, trips, reports, and problems. Machwart.

**Ch. E. 109 y. Chemical Engineering Thermodynamics (4)**—Two lectures. Prerequisites, Chem. 102 A y and Ch. E. 103 y.

A study of the application of the principles of engineering and chemical thermodynamics to some industrial problems encountered in the practice of chemical engineering.

**Ch. E. 110 y. Chemical Engineering Calculations (9)**—Three lectures, fall semester; six lectures, spring semester. Prerequisites, Math. 23 y, and Ch. E. 103 y.

A study of methods for analyzing chemical engineering problems along quantitative and mathematical lines, with the calculus and other mathematical aids such as infinite series and Bessel's functions. Emphasis is placed on graphical presentations and the engineering utility of the results.

#### COURSES FOR GRADUATES

**Ch. E. 201 y. Graduate Unit Operations (10 or more).** Prerequisite, permission of Department of Chemical Engineering.

Advanced theoretical treatment of typical unit operations in chemical engineering. Problems. Laboratory operation of small scale semi-commercial type equipment with supplementary reading, conferences and reports. Huff.

**Ch. E. 202 s. Gas Analysis (3)**—Lecture; two laboratories. Prerequisite, permission of Department of Chemical Engineering.

Quantitative determination of common gases, fuel gases, gaseous vapors and important gaseous impurities. Problems. Huff, Machwart.

**Ch. E. 207 A f, 208 A s. Plant Design Studies (3, 3)**—Three lectures.

An examination of the fundamentals entering into the selection of processes, the specifications for and choice and location of equipment and plant sites. Problems. Huff.

**Ch. E. 207 B f, 208 B s. Plant Design Studies Laboratory (2, 2).** Six hours of laboratory work which may be elected, to accompany or to follow Ch. E. 207 A and 208 A. Machwart.

**Ch. E. 209 y. Gaseous Fuels (4)**—Two lectures. Prerequisite, permission of Department of Chemical Engineering.

An advanced treatment of some of the underlying scientific principles involved in the production, transmission, and utilization of gaseous fuels. Problem in the design and selection of equipment. Huff.

**Ch. E. 203 f, 204 s. Graduate Seminar (1, 1).** Required of all graduate students in chemical engineering.

Students prepare reports on current problems in chemical engineering and participate in the discussion of such reports. Staff.

**Ch. E. 205. Research.**

The investigation of special problems and the preparation of a thesis in partial fulfillment of the requirements of an advanced degree.

## B. Civil Engineering

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**C. E. 101 s. Hydraulics (4)**—Three lectures; one laboratory. Prerequisite, Mech. 101 f.

Hydrostatic pressures on tanks, dams, and pipes. Flow through orifices, nozzles, pipe lines, open channels, and weirs. Use of Reynold's number. Measurement of water. Elementary hydrodynamics. Ernst.

**C. E. 102 s. Hydraulics (3)**—Two lectures; one laboratory. Prerequisite, Mech. 101 f or Mech. 102 f.

A shorter course than C. E. 101 s, with emphasis on water wheels, turbines, and centrifugal pumps. Lowe, Sherwood.

**C. E. 103 f. Curves and Earthwork (3)**—Two lectures; one laboratory. Prerequisite, Surv. 2 y.

Computation and field work for simple, compound, and reversed circular curves; transition curves; vertical and horizontal parabolic curves. Preliminary and final location survey, cross-sectioning, and computation of earth work, including haul and mass diagram. Allen.

**C. E. 104 s. Theory of Structures (5)**—Four lectures; one laboratory. Prerequisite, Mech. 101 f.

Analytical and graphical determination of dead and live load stresses in framed structures. Influence lines for reactions, shears, moments, and stresses. Analysis of lateral bracing systems. Elements of slope and deflection; rigid frames. Allen.

**C. E. 105 f. Elements of Highways (3)**—Two lectures; one laboratory. Prerequisite, Mech. 101 f.

Location, design, construction, and maintenance of roads and pavements. Field inspection trips. Steinberg.

**C. E. 106 y. Concrete Design (7)**—Three lectures, one laboratory, first semester; two lectures, one laboratory, second semester. Prerequisite, C. E. 104 s.

A continuation of C. E. 104 s, with special application to the design and detailing of plain and reinforced concrete structures, which include slabs, columns, footings, beam bridges, arches, retaining walls, and dams. Applications of slope-deflection and moment distribution theories and rigid frames. Allen.

**C. E. 107 y. Structural Design (7)**—Three lectures, one laboratory, first semester; two lectures, one laboratory, second semester. Prerequisite, C. E. 104 s.

A continuation of C. E. 104 s, with special application to the design and detailing of structural steel sections, members and their connections, for roof trusses, plate girders, highway and railway bridges, buildings, bracing systems, and grillage foundations. Allen.

**C. E. 108 y. Municipal Sanitation (6)**—Two lectures; one laboratory. Prerequisite, C. E. 101 s.

Methods of estimating consumption and designing water supply and sewerage systems. Hall.

**C. E. 110 s. Soils and Foundations (3)**—Two lectures; one laboratory. Prerequisite, C. E. 104 s.

An introductory study of the properties and behavior of soil as an engineering material. Applications to engineering construction. Lowe.

#### COURSES FOR GRADUATES

**C. E. 201 f. Advanced Properties of Materials (3).** Prerequisite, Mech. 103 s or equivalent.

A critical study of elastic and plastic properties, flow of materials, resistance to failure by fracture, impact, and corrosion, the theories of failure. Assigned reading from current literature. Ernst.

**C. E. 202 f. Advanced Strength of Materials (3).** Prerequisite, Mech. 101 f or equivalent.

Special problems in engineering stress analysis. Limitations of flexure and torsion formulas, unsymmetrical bending, curved beams, combined stresses, thin tubes, thick-walled cylinders, and flat plates. Ernst.

**C. E. 203 s. Applied Elasticity (3).** Prerequisite, Math. 114 f or equivalent.

Two dimensional elastic problems, general stress-strain analysis in three dimensions, stability of beams, columns, and thin plates. Ernst.

**C. E. 204 f. Soil Mechanics (3).** Prerequisite, C. E. 110 s or equivalent. A detailed study of the properties of engineering soils. Assigned reading from current literature. Lowe.

**C. E. 205 s. Advanced Foundations (3).** Prerequisite, C. E. 106 y or equivalent.

A detailed study of types of foundations. Design and construction to meet varying soil conditions. Allen.

**C. E. 206 s. Highway Engineering (3).** Prerequisite, C. E. 105 f or equivalent.

An intensive course in the location, design and construction of highways. Steinberg.

**C. E. 207 y. Theory of Concrete Mixtures (6).** Prerequisite, Mech. 103 s or equivalent.

A thorough review of the methods for the design of concrete mixtures, followed by a study of factors affecting the properties of the resulting concrete. This course is intended as a background for work in the field of concrete, concrete aggregates, or reinforced concrete. Walker, Ernst.

**C. E. 208. Research.** Credit in accordance with work outlined.

The investigation of special problems and the preparation of a thesis in partial fulfillment of the requirements for an advanced degree. Staff.

### C. Mechanical Engineering

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**M. E. 101 f. Principles of Mechanical Engineering (3)**—Two lectures, one laboratory. Prerequisites, Math. 23 y and Phys. 2 y.

Elementary thermodynamics and the study of heat, fuel, and combustion in the production and use of steam for the generation of power. Includes study of fundamental types of steam boilers, fuel burning equipment, prime movers, and their allied apparatus. Supplemented by laboratory tests and trips to industrial plants. Sherwood.

**M. E. 102 f. Thermodynamics (3)** — Three lectures. Prerequisites, Math. 23 y and Phys. 2 y.

The theory and application of thermodynamics to the steam engine, steam turbine, nozzles. The property of vapors, cycles of heat and entropy, including discussion of machines and their uses. Green.

**M. E. 103 s. Power Plants (3)**—Two lectures; one laboratory.

A study of heat, fuel and combustion in the production and use of steam for the generation of power. Includes the theory and operation of steam



engines, boilers, condensers, steam turbines, and their accessories. Practical power problems as applied to typical power plants, supplemented by laboratory tests and trips to industrial plants. Green.

**M. E. 104 y. Thermodynamics (5)**—Two lectures, first semester; three lectures, second semester. Prerequisite, Math. 23 y and Phys. 2 y.

The properties and fundamental equations of gases and vapors. Thermodynamics of heat cycles, air compressors, and steam engines.

Huckert, Sherwood.

**M. E. 105 s. Aerodynamics and Hydrodynamics (3)**—Three lectures. Prerequisites, Math. 23 y, Phys. 2.

A study of the fundamental principles of the flow of air and of water. Applications with special reference to the airplane; airfoil and propeller theory; theory of model testing in wind tunnels; design performance calculations of airplanes. Younger.

**M. E. 106 f. Heating and Ventilation (3)**—Two lectures; one laboratory. Prerequisite, M. E. 103 y.

The study of types of heating and ventilating systems for a particular building; layout of piping and systems, with complete calculations and estimates of costs; fundamentals of air conditioning. Dill.

**M. E. 107 s. Refrigeration (3)**—Two lectures; one laboratory. Prerequisite, M. E. 103 y.

Problems involving the different methods and processes of refrigeration. Air conditioning for offices, buildings, factories and homes. Dill.

**M. E. 109 y. Prime Movers (8)**—Three lectures; one laboratory. Prerequisites, Mech. 101 f, C. E. 102 s.

A course covering the use of prime movers to convert heat into power. It includes a study of heat, fuels and combustion processes followed by the theory, construction and operation of internal combustion engines, steam engines, boilers, condensers, steam turbines and their auxiliary equipment. Theory is supplemented by practical problems and by laboratory tests. The entire course is closely integrated with the Mechanical Laboratory course. Green.

**M. E. 110 y. Mechanical Engineering Design (7)**—Two lectures; two laboratories, first semester; one lecture, two laboratories, second semester. Prerequisite, Mech. 101 f and M. E. 102 y.

A course embracing the kinematics and dynamics of machinery and the design of machine members and mechanisms. Special problems on the balancing, vibration, and critical speeds of machine members are treated.

Huckert.

**M. E. 111 y. Mechanical Laboratory (4)**—One lecture, one laboratory. Calibration of instruments, gauges, indicators, steam, gas and water meters. Indicated and brake horsepower of steam and internal combustion



engines, setting of valves, tests for economy and capacity of boilers, engines, turbines, pumps, and other prime movers. Feed water heaters and condensers; B.T.U. analysis of solid, gaseous, and liquid fuels, and power plant tests. Younger and staff.

**M. E. 112 y. Airplane Structures (6)**—Three lectures. Prerequisite, M. E. 105 s.

The fundamental principles of structural analysis and design of airplanes. The air worthiness requirements of the Civil Aeronautical Authority and the design requirements of the government service branches are given. Younger.

#### COURSES FOR GRADUATES

**M. E. 201 y. Advanced Statics and Dynamics of Machinery (6)**—Three lectures. Prerequisites, Mech. 101 f and Math. 114 f, or equivalent.

Analysis of motions and forces in machines. Vibrations, and vibration damping. Noise elimination. Critical speeds of shafts and discs. Laboratory demonstrations. Younger.

**M. E. 202 y. Advanced Aircraft Structures (6)**—Three lectures. Prerequisite, M. E. 112 y or equivalent.

Methods of analysis in advanced problems of designing. Study of research reports in aircraft structures. Wickersham, Younger.

**M. E. 203 y. Advanced Hydrodynamics and Aerodynamics (6)**—Three lectures. Prerequisite, M. E. 105 s or equivalent.

Theoretical and experimental study of the flow of fluids. Wickersham.

**M. E. 204 y. Advanced Thermodynamics and Heat Transfer (6)**—Three lectures. Prerequisites, M. E. 104 y and M. E. 109 y, or equivalent.

Application of the laws of thermodynamics to industrial processes. Energy transfer by radiation, conduction, and convection. Green.

**M. E. 205 y. Seminar in Mechanical Engineering (2-6)**—Credit in accordance with work outlined.

Seminars may be organized in any field of mechanical engineering for the study of general theory or specific problems. Staff.

#### ENGLISH LANGUAGE AND LITERATURE

**Special Departmental Requirements for Degrees, in Addition to the General Requirements of the Graduate School.**

##### MASTER OF ARTS

1. Candidates for the degree of Master of Arts in the Department of English must demonstrate a reading knowledge of French or German at the time of admission, or not later than six months before taking the degree.

2. In the thesis the candidate will be expected to demonstrate his ability to use the ordinary methods of research in the discovery of knowledge and to organize and present his findings in a clear, effective English style.

3. The final examination will be based in part upon the courses pursued and in part upon first-hand knowledge of all the literary works included in the departmental list of reading for the Master's degree. The examination will test the candidate's powers of analysis and criticism.

Major work in the department may be elected in any of the following fields, the requirements of which are listed below.

a. Major work in English literature: Old English, and at least six hours from seminar courses in Medieval Romance, the Elizabethan period, the Eighteenth Century, The Romantic period, the Victorian period.

b. Major work in American literature; the seminar in American literature, and at least six hours from the advanced undergraduate courses in American literature.

c. Major work in drama: History of the Theatre, and at least six hours from the following: Introduction to Comparative Literature (first semester), Medieval Drama, Elizabethan Drama, Modern Drama, Contemporary Drama, American Drama, The Faust Legend, The Modern German Drama, Spanish Drama, Ibsen.

d. Major work in philology: Old English, Beowulf, Seminar in Old English Poetry, Middle English, Gothic, and either Medieval Romance or Chaucer.

e. General major (designed chiefly for teachers in secondary schools): Old English, and at least six hours from the following groups: Elizabethan Drama, or an Elizabethan seminar; Milton; the Eighteenth Century; Prose and Poetry of the Romantic Age or Seminar in the Romantic Period; Contemporary American Prose and Poetry or the American seminar; Victorian Prose and Poetry or Seminar in the Victorian Period; The English Novel; Advanced Writing.

Minor work may also be elected in these fields, but no major and minor combination of a. and e. will be permitted.

#### DOCTOR OF PHILOSOPHY

Each candidate must have the following courses:

a. Three credit hours in Comparative Literature.

b. Six credit hours in Old English (Eng. 102 f, 103 s, and 212 s).

c. Four credit hours in the Middle English Language (Eng. 202 f) and Gothic (Eng. 203 s).

Candidates must pass a comprehensive written examination, preferably one year before they expect to be awarded degrees. This examination will include linguistics (morphology and phonology) and each of the major literary fields, from which the candidate may select two for particularly detailed examination, specifically: Old English, Middle English, the Drama, the Sixteenth and Seventeenth Centuries, the Eighteenth Century, the Nineteenth Century, American Literature.

## COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Eng. 101 s. History of the English Language (3)**—Three lectures. Prerequisite, Eng. 14 f.

An historical survey of the English language; its nature, origin and development, with special stress upon structural and phonetic changes in English speech and upon the rules which govern modern usage. Harman.

**Eng. 102 f. Old English (3)**—Three lectures. Prerequisite, Eng. 14 f.

A study of Old English grammar and literature. Lectures on the principles of phonetics and comparative philology. Ball.

**Eng. 103 s. Beowulf (3)**—Three lectures. Prerequisite, Eng. 102 f.

A study of the Old English epic in the original. Ball.

**Eng. 104 f. Chaucer (3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s.

A study of the *Canterbury Tales*, *Troilus and Criseyde*, and the principal minor poems, with lectures and readings on the social background of Chaucer's time. Hale.

**Eng. 105 f. Medieval Drama in England (3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s.

A study of the development of medieval English drama from its beginning to 1540. Class discussion of significant plays, outside reading, reports. Fitzhugh.

**Eng. 106 s. Elizabethan Drama (3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s.

A study of the change in spirit and form of English drama from 1540 to 1640, as seen in the works of the important dramatists other than Shakespeare. Class discussion of significant plays, outside reading, written dramatic criticisms. Zeeveld.

**Eng. 107 s. Renaissance Poetry and Prose (3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s. (Not given in 1941-1942.)

A study of the literary manifestations of humanism and the new national spirit in sixteenth-century England, with emphasis on the prose works of More, Lyly, Sidney, Hooker, Bacon, and the translators of the Bible, and on the poetry of Spenser. Zeeveld.

**Eng. 108 f. Milton (2)**—Two lectures. Prerequisites, Eng. 2 f and 3 s.

A study of the poetry and the chief prose works. Murphy.

**Eng. 109 f. Literature of the Seventeenth Century to 1660 (2)**—Two lectures. Prerequisites, Eng. 2 f and 3 s.

A study of the chief prose writers and of the Metaphysical and Cavalier traditions in poetry. Murphy.

**Eng. 110 f. The Age of Dryden (2)**—Two lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s. (Not given in 1941-1942.)

This course emphasizes the relation of literature to the philosophical movements of the age. Murphy.

**Eng. 111 f, 112 s. Literature of the Eighteenth Century (2, 2)**—Two lectures. Prerequisites, Eng. 2 f and 3 s.

First semester, readings in the period dominated by Defoe, Swift, Addison, Steele, and Pope.

Second semester, Dr. Johnson and his circle; the rise of Romanticism; the Letter Writers. Fitzhugh.

**Eng. 113 f, 114 s. Prose and Poetry of the Romantic Age (3, 3)**—Three lectures. Prerequisites, Eng. 1 y and Eng. 2 f and 3 s.

First semester, a study of the development of the Romantic movement in England as exemplified by the prose and poetry of Wordsworth, Coleridge, Lamb, DeQuincy, and others.

Second semester, a study of the later Romantic writers, including Byron, Shelley, Keats, and others. Hale.

**Eng. 115 f. Scottish Poetry (2)**—Two lectures. Prerequisites, Eng. 2 f and 3 s. No knowledge of the Scottish dialect required. (Not given in 1941-1942.)

Readings in the Scottish Chaucerians; Drummond of Hawthornden; song and ballad literature; poets of the vernacular revival: Ramsey, Ferguson, and Burns. Papers and reports. Fitzhugh.

**Eng. 116 f, 117 s. Victorian Prose and Poetry (3, 3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s.

A study of the chief English authors of the nineteenth century from the close of the Romantic Period. Cooley.

**Eng. 118 s. Modern and Contemporary British Poets (3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s.

A study of the chief English and Irish poets of the twentieth century.

Murphy.

**Eng. 120 f, 121 s. The History and Development of the Novel in England (3, 3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s. (Not given in 1941-1942.)

A study of the origin and development of the novel as a form in England. Ide.

**Eng. 123 f. Modern Drama (3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s.

A survey of English drama during the two centuries from 1660 to 1860. Class discussion of significant plays, outside reading, reports. Fitzhugh.

**Eng. 124 s. Contemporary Drama (3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s.

A study of significant European and American dramatists from Ibsen to O'Neill. Class discussion of significant plays, outside reading, reports. Fitzhugh.

**Eng. 125 f. Emerson, Thoreau, and Whitman (3)**—Three lectures. Prerequisites, Eng. 7 f and 8 s.

A study of the major writings of Emerson, Thoreau, and Whitman, with emphasis on transcendentalism, idealism, and democracy. Warfel.

**Eng. 126 s. American Fiction (3)**—Three lectures. Prerequisites, Eng. 7 f and 8 s.

Historical and critical study of the short story and novel in the United States from 1789 to 1920. Warfel.

**Eng. 127 f. Contemporary American Poetry and Prose (3)**—Three lectures. Prerequisites, Eng. 7 f and 8 s. (Not given in 1941-1942.)

Tendencies and forms in non-dramatic literature since 1920. Warfel.

**Eng. 128 s. American Drama (3)**—Three lectures. Prerequisites, Eng. 7 f and 8 s. (Not given in 1941-1942.)

Historical study of representative American plays and playwrights from 1789 to 1920. Warfel.

**Eng. 129 f. Types of English Literature (3)**—Three lectures.

An historical and critical survey of the principal types of English literature, with especial attention to the influence of classical myth and legend and of classical literary ideals upon English and American writers. Harman.

**Eng. 135 f. Introduction to Creative Writing (2)**—Two lectures. Prerequisites, Eng. 2 f and 3 s.

Theory and practice in the short story and lyric, with some study of the novelette and play at the election of the class. Bryan.

**Eng. 136 s. Magazine Writing (2)**—Two lectures. Prerequisites, Eng. 2 f and 3 s.

The production and marketing of such literary forms as the magazine article, the personal essay, the biographical essay, and the book review. Bryan.

**Eng. 137 s. Advanced Creative Writing (2)**—Two lectures. Prerequisites, Eng. 135 f or 136 s, or permission of the instructor after submission of an original composition.



Study and exercise in original literary expression as an interpretative art.  
Bryan.

**Eng. 140 f. Major American Poets (3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s.

Intensive study of the poetry and poetic theories of the major American poets since Bryant.

**Eng. 141 s. Major American Prose Writers (3)**—Three lectures. Prerequisites, Eng. 2 f and 3 s.

Intensive study of the major non-fiction prose writers of nineteenth century United States.

#### COURSES FOR GRADUATES

**Eng. 200. Seminar in Special Studies (1-3).** Credit according to the importance of the work assigned.

Work under personal guidance in some problem of special interest to the student but not connected with the thesis.  
Staff.

**Eng. 201. Research.** Credit proportioned to the amount of work and ends accomplished.

Original research and the preparation of dissertations for the doctor's degree.  
Staff.

**Eng. 202 f. Middle English Language (2-3)**—Two lectures. Prerequisites, Eng. 102 f and 103 s.

A study of readings of the Middle English period, with reference to etymology and syntax.  
Harman.

**Eng. 203 s. Gothic (2)**—Two lectures. Prerequisite, Eng. 102 f.

A study of the forms and syntax, with readings from the *Ulfilas Bible*. Correlation of Gothic speech sounds with those of Old English.  
Harman.

**Eng. 204 y. Medieval Romance in England (4)**—Two lectures. (Not given in 1941-1942.)

Lectures and readings in the cyclical and non-cyclical romances in Medieval England, and their sources, including translations from the Old French.  
Hale.

**Eng. 205 s. Seminar in Sixteenth Century Literature (2-3)**—Two lectures.

Studies and problems in sixteenth century literature other than Shakespeare.  
Zeeveld.

**Eng. 206 y. Seminar in Spenser (4)**—Two lectures.

A survey of the works of Edmund Spenser, with special attention to *The Faerie Queene*.  
McManaway.



**Eng. 207 f. Seminar in Shakespeare (2-3)**—Two lectures. Prerequisites, Eng. 11 f and Eng. 12 s, or equivalents.

Studies and problems in Shakespeare. Zeeveld.

**Eng. 208 s. Seminar in Eighteenth Century Literature (2-3)**—Two lectures.

Intensive study of one man's work or of one important movement of the century. Fitzhugh.

**Eng. 209 y. Seminar in American Literature (4-6)**—Two lectures.

Critical and biographical problems in nineteenth century American literature. The subject for 1941-1942 will be: First semester, the major writings of C. B. Brown, Hawthorne, and Poe; second semester, Harte, Twain, and Howells. Warfel.

**Eng. 210 f. Seminar in the Romantic Period (2-3)**—Two lectures. Prerequisites, Eng. 113 f and 114 s, or an equivalent satisfactory to the instructor. One discussion period of two hours.

Special studies of problems or persons associated with the Romantic movement. The subject matter of the course will vary with the interests of the class. Hale.

**Eng. 211 y. Seminar in the Victorian Period (4-6)**—Two or three lectures. Prerequisites, Eng. 116 f and 117 s, or the permission of the instructor.

Special studies of problems or persons in the Victorian Age. The subject matter of the course will vary with the interests of the class.

Cooley.

**Eng. 212 s. Old English Poetry (2-3)**—Two lectures. Prerequisite, Eng. 102 f or equivalent.

A study of Old English poetic masterpieces other than the Beowulf.

Ball.

## ENTOMOLOGY

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Ent. 101 y. Economic Entomology (4)**—Two lectures. (Not offered in 1941-1942.)

An intensive study of the problems of applied entomology, including life history, ecology, behavior, distribution, parasitism, and control. Cory.

**Ent. 103 y. Seminar (2).**

Presentation of original work, book reviews, and abstracts of the more important literature. Cory, Knight.

**Ent. 104 f and s. Insect Pests of Special Groups (6)**—Two lectures; one laboratory. Prerequisite, Ent. 1 f or s.

A study of the principal insect pests of one or more of the following groups, founded upon food preferences and habitat. The course is intended to give the general student a comprehensive view of the insects that are of importance in his major field of interest, and detailed information to the student specializing in entomology.

Insect Pests of: 1, Fruit; 2, Vegetables; 3, Flowers, both in the open and under glass; 4, Ornamental and shade trees; 5, Forests; 6, Field crops; 7, Stored products; 8, Live stock; 9, The household. Cory.

**Ent. 105 f. Medical Entomology (2)**—Two lectures. Prerequisite, Ent. 1 f or s, and consent of instructor.

The relation of insects to diseases of man, directly and as carriers of pathogenic organisms. Control of pests of man. The fundamentals of parasitology. Knight.

**Ent. 106 s. Insect Taxonomy (3)**—Two lectures; one laboratory.

An advanced course dealing with the principles and practices underlying modern systematic entomology. Gurney.

**Ent. 107 s. Theory of Insecticides (2)**—Two lectures.

The development and use of contact and stomach poisons, with regard to their chemistry, toxic action, compatibility, and foliage injury. Recent work with insecticides will be especially emphasized. Ditman.

**Ent. 109 s. Insect Physiology (2)**—Two lectures, occasional demonstrations. Enrollment subject to consent of instructor.

The functioning of the insect body with particular reference to blood, circulation, digestion, absorption, respiration, reflex action and the nervous system, metabolism, and excretion. Yeager.

**Ent. 110 f or s. Special Problems.** Credit and prerequisite to be determined by the staff.

The intensive investigation of some entomological subject.

Cory and staff.

**Ent. 111 s. Coccidology (2)**—Two laboratories.

A study of morphology, taxonomy, and biology of the higher groups of the scale insects. The techniques of preparation and microscopy are emphasized. Laboratory studies are supplemented by occasional lectures. McConnell.

#### COURSES FOR GRADUATES

**Ent. 201. Advanced Entomology (1-3).**

Studies in minor problems in morphology, taxonomy, and applied entomology, with particular reference to preparation for individual research. Cory.

**Ent. 202. Research.**

Advanced students having sufficient preparation, with approval of the head of the department, may undertake supervised research in morphol-

ogy, taxonomy, or biology and control of insects. Frequently the students may be allowed to work on Station or State Horticultural Department projects. The student's work may form a part of the final report on the project and be published in bulletin form. A dissertation, suitable for publication, must be submitted at the close of the studies as a part of the requirements for an advanced degree. Cory and staff.

**Ent. 203 f. Insect Morphology (2-4)**—Two lectures, and laboratory work by special arrangement, to suit individual needs.

Insect anatomy with special relation to function. Given particularly in preparation for work in physiology and other advanced studies.

Snodgrass.

**Ent. 204 y. Economic Entomology (6)**—Three lectures. (Not offered in 1941-1942.)

Studies of the principles underlying applied entomology, and the most significant advances in all phases of entomology. Cory.

**Ent. 205 s. Insect Ecology (2)**—One lecture, one laboratory.

A study of the fundamental factors involved in the relationship of insects to their environment. Emphasis is placed on the insect as a dynamic organism adjusted to the environment. Langford.

## HISTORY

### Special Departmental Requirements for Degrees, in Addition to the General Requirements of the Graduate School.

#### MASTER OF ARTS

Eight to ten semester hours of the total major course requirement of all candidates for this degree must be acquired in the general field of the thesis, i. e., European History or American History, as the case may be.

#### DOCTOR OF PHILOSOPHY

1. At least thirty semester hours of the total major course requirement must be acquired in the general field of the thesis, i. e., American History or European History, as the case may be.

2. The preliminary examination for admission to candidacy covers both the major and minor fields.

#### A. American History

##### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**H. 101 y. American Colonial History (6)**—Three lectures. Prerequisite, H. 5 f, 6 s, or equivalent.

A study of the political, economic and social development of the American people from the discovery of America through the formation of the constitution. Baker-Crothers.

**H. 107 f or s. The United States from the Civil War to 1900 (3)**—Three lectures. Prerequisite, H. 6 s, or equivalent. (Not offered in 1941-1942.)

Selected topics intended to provide an historical basis for an understanding of problems of the present century.

**H. 108 f or s. The United States in the 20th Century (3)**—Three lectures. Prerequisite, H. 6 s, or equivalent.

A study of the outstanding economic and political problems and of the cultural changes of the last fifty years, with the purpose of understanding our own day. Gewehr.

**H. 111 f, 112 s. Social and Economic History of the United States to 1860 (3, 3)**—Three lectures. Prerequisite, H. 5 f, 6 s, or equivalent.

First semester, an advanced course giving a synthesis of American life in the colonial period.

Second semester, the period from 1790 to 1860. Baker-Crothers.

**H. 115 y. Constitutional History of the United States (6)**—Three lectures. Prerequisite, H. 5 f, 6 s.

A study of the historical forces resulting in the formation of the constitution, and of the development of American constitutionalism in theory and practice thereafter. Thatcher.

**H. 119 f, 120 s. Diplomatic History of the United States (2, 2)**—Two lectures. Prerequisite, H. 5 f, 6 s, or equivalent.

An historical study of the diplomatic negotiations and foreign relations of the United States from the American Revolution to the present. Dozer.

**H. 121 f, 122 s. History of the American Frontier (3, 3)**—Three lectures. Prerequisite, H. 5 f, 6 s, or equivalent.

A study of the influence of the westward movement in shaping American institutional development.

First semester, the trans-Allegheny West.

Second semester, the trans-Mississippi West. Gewehr.

**H. 123 f. The Old South and the Civil War (3)**—Three lectures. Prerequisite, H. 5 f, 6 s, or equivalent.

A study of the institutional and cultural life of the ante-bellum South with particular reference to the development of sectionalism and the background of the Civil War. Gewehr.

**H. 124 s. Reconstruction and the Recent South (3)**—Three lectures. Prerequisite, H. 5 f, 6 s, or equivalent.

Economic, social and political changes in the South after the Civil War. Factors and influences shaping the present South and some of the concomitant problems. Gewehr.

**H. 125 f, 126 s. History of Maryland (2, 2)**—Two lectures. Prerequisite, H. 5 f, 6 s, or equivalent.

First semester, a survey of the political, social and economic history of colonial Maryland.

Second semester, Maryland's historical development and role as a state in the American union. Dozer.

**H. 127 f, 128 s. Latin American History (2, 2)**—Two lectures. Prerequisite, six hours of fundamental courses.

First semester, a survey of the colonial history of Latin America through the wars of independence.

Second semester, history of the Latin American states from the wars of independence to the present, with special attention to Argentina, Brazil, Chile, and Mexico, and their relations to the United States.

Dozer.

#### COURSES FOR GRADUATES

**H. 200. Research.** Credit proportioned to the amount of work. Staff.

**H. 201 y. Seminar in American Colonial History (4).** Conferences and reports in related topics. Baker-Crothers.

**H. 202 f. Historical Criticism and American Bibliography (2).**

Thatcher.

#### B. European History

**H. 131 f, 132 s. Ancient History (3, 3)**—Three lectures. A general survey of the Near East, Greece and Rome.

First semester, the Near East and Greece; second semester, Rome.

Highby.

**H. 133 y. Medieval History (6)**—Three lectures. Prerequisite, H. 1 y, or equivalent.

A study of the Medieval period with special emphasis on the legacy of the Middle Ages.

**H. 135 f, 136 s. Renaissance and Reformation (3, 3)**—Three lectures. Prerequisite, H. 1 y, or equivalent. (Not offered in 1941-1942.)

First semester, the Renaissance; second semester, the Reformation.

**H. 137 f, 138 s. Revolutionary and Napoleonic Europe (2, 2)**—Two lectures. Prerequisite, H. 1 y, or equivalent. (Not offered in 1941-1942.)

First semester, Revolutionary France and its influence on Europe.

Second semester, the Napoleonic regime and the balance of power.

Silver.

**H. 139 f, 140 s. Europe in the Nineteenth Century, 1815-1914 (3, 3)**—Three lectures and assignments. Prerequisite, H. 1 y, or equivalent.

A study of the political, economic, social and cultural development of Europe from the Congress of Vienna to the World War. Strakhovsky.



**H. 143 f, 144 s. Europe since 1914 (2, 2)**—Two lectures and assignments. Prerequisite, H. 1 y, or equivalent. (Not offered in 1941-1942.)

A study of the political, economic, social and cultural development of Europe with special emphasis towards understanding the two World Wars.  
Strakhovsky.

**H. 151 f, 152 s. Diplomatic History of Europe since 1871 (3, 3)**—Three lectures and assignments. Prerequisite, H. 1 y, or equivalent. (Not offered in 1941-1942.)

A study of European diplomacy, imperialism and power politics since the Franco-Prussian War.  
Strakhovsky.

**H. 155 f, 156 s. History of Central Europe (3, 3)**—Three lectures. Prerequisite, H. 1 y, or equivalent. (Not offered in 1941-1942.)

The history of Central Europe from 1600 to the World War, with special emphasis on Germany and Austria.  
Prange.

**H. 157 f, 158 s. Central Europe in the World Today (2, 2)**—Two lectures. Prerequisite, H. 1 y, or equivalent.

An analysis of the origins, the philosophical bases and the influence of National Socialism and Hitler. Special emphasis will be placed upon the problems involved in the present world conflict.  
Prange.

**H. 161 f, 162 s. History of the Near East (2, 2)**—Two lectures and assignments. Prerequisite, H. 1 y, or equivalent.

First semester, a study of the Balkans and of Turkey to the Congress of Berlin of 1878.

Second semester, a study of the Balkan states and Turkey from 1878 to the present.  
Strakhovsky.

**H. 171 f, 172 s. History of the British Empire (3, 3)**—Three lectures. Prerequisite, H. 1 y, or H. 3 y, or equivalent.

First semester, the rise of the Old Mercantilist Empire in the East and West, and its decline in the period of the American Revolution.

Second semester, the evolution of Great Britain from Empire to Commonwealth of Nations.  
Silver.

#### COURSES FOR GRADUATES

**H. 200. Research.** Credit proportioned to the amount of work. Staff.

**H. 203 s. Historical Criticism and European Bibliography (2).**  
Strakhovsky.

**H. 204 y. Seminar in European History (4).** Reports and discussions on specified topics.  
Strakhovsky.

**H. 205 y. Russia-U. S. S. R. (4)**—Lectures, reports and discussions. (Not offered in 1941-1942.)  
Strakhovsky.



**H. 206 y. Seminar in Central European History (4).** Topics pertaining mainly to recent Germany. (Not offered in 1941-1942.) Prange.

## HOME ECONOMICS

### A. Foods and Nutrition

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**H. E. 131 f or s. Nutrition (3)**—Three recitations. Prerequisites, H. E. 31 y and Chem. 12 A y.

A scientific study of principles of human nutrition. Welsh.

**H. E. 132 s. Dietetics (3)**—Two recitations; one laboratory. Prerequisite, H. E. 131 f.

A study of food selection for health; planning and calculating diets for adults and children. Welsh.

**H. E. 133 f and s. Demonstrations (2)**—Two laboratories. Prerequisites, H. E. 115, 31 y and 71 f, or consent of the instructor.

Practice in demonstrations. Welsh.

**H. E. 134 f and s. Advanced Foods (3)**—One recitation; two laboratories. Prerequisite, H. E. 31 y.

Advanced study of manipulation of food material. Welsh.

**H. E. 135 f and s. Experimental Foods (4)**—Two recitations; two laboratories. Prerequisites, H. E. 31 y, H. E. 137 s, Chem. 12 A y.

A study of food preparation processes from experimental viewpoint. Practice in techniques. Kirkpatrick.

**H. E. 136 s. Child Nutrition (3)**—Two recitations, one laboratory. Prerequisites, H. E. 32 f, or H. E. 131 f, or consent of instructor.

Principles of human nutrition applied to growth and development of children; including experience with children in the nursery school, in children's hospitals, and clinics. Welsh.

**H. E. 137 f and s. Food Buying and Meal Service (3)**—One recitation; two laboratories. Prerequisite, H. E. 31 y.

Study of problems in food buying; planning and serving of meals for the family group; simple entertaining in relation to nutritional needs and cost. Kirkpatrick.

**H. E. 138 s. Diet in Disease (3)**—One recitation; two laboratories. Prerequisite, H. E. 131 f.

Modification of the principles of human nutrition to meet dietary needs of certain diseases.

## COURSES FOR GRADUATES

**H. E. 201 f or s. Seminar in Nutrition (2).**

Reports and discussions on current literature of nutrition.

Staff.

**H. E. 202. Research.** Credits to be determined by amount and quality of work done.

With the approval of the head of the department, students may pursue an original investigation in some phase of foods. The results may form the basis of a thesis for an advanced degree.

Welsh.

**H. E. 203 f or s. Advanced Experimental Foods (3)**—One recitation; two laboratories.

Individual experimental problems. Special emphasis on use of Maryland products.

Kirkpatrick.

**H. E. 204 f. Readings in Nutrition (2).**

Reports and discussions of outstanding nutritional research and investigation.

Welsh.

**H. E. 205 f or s. Nutrition (3)**—One recitation; laboratory by arrangement.

Feeding experiments are conducted on laboratory animals to show effects of diets of varying compositions.

Welsh.

**B. Home and Institution Management**

## COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**H. E. 141 f, 142 s. Management of the Home (3, 3)**—Two lectures, one laboratory.

The family and human relations; household organization and management; budgeting of time and money. Housing as a social problem; federal and civic housing projects; housing standards for the family; building and financing a home. Selection and care of household equipment and furnishings.

Enright.

**H. E. 125 f and s. Merchandise Display (2)**—Two laboratories. Prerequisite, H. E. 21 f or equivalent.

Practice in effective display of merchandise windows, show cases, and other parts of store interiors. Cooperation with retail establishments. Five large display windows in the home economics building provides demonstration space for the courses.

Curtiss.

**H. E. 127 f, 128 s. Advanced Costume Design (2)**—Two laboratories. Prerequisites, H. E. 21 f, H. E. 24 f, H. E. 111 f or equivalent.

Fashion illustration and design. Special emphasis is placed on originality and the adaptability of designs to fabrics and personalities.

Baumann.

### C. Textiles and Clothing

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**H. E. 111 f and s. Advanced Clothing (3)**—Three laboratories. Prerequisite, H. E. 11 s and H. E. 24 f or equivalent.

Draping of garments in cloth on a dress form; stressing style, design and suitability to the individual. McFarland.

**H. E. 112 f or s. Problems in Clothing (3)**—Three laboratories. Prerequisite, H. E. 11 f and H. E. 111 f or equivalent.

Clothing renovation, clothing for children, and individual clothing projects. Mitchell.

**H. E. 113 f or s. Pattern Designing (2)**—Two laboratories. Prerequisite, H. E. 11 f.

A comparative study of commercial patterns; the development of a foundation pattern and its adaptation in the designing of garments. Mitchell.

**H. E. 170 f or s. Consumer Problems in Textiles (3)**—Two recitations, one laboratory. Prerequisite, H. E. 71 f or consent of the instructor.

Laundrying and dry cleaning of clothing and household furnishings; storage of clothing and furs; comparison and evaluation of fabrics. Moore.

**H. E. 171 f or s. Advanced Textiles (3)**—One recitation, two laboratories. Prerequisite, H. E. 71 f, Chem. 12 A y and 12 B y.

A study of recent research and commercial development in textiles; textile microscopy; physical and chemical analysis of textile fabrics. Moore.

**H. E. 172 f or s. Problems in Textiles (4)**—One recitation, two laboratories. Prerequisite, H. E. 171 f.

Experimental work in textiles. Moore.

### D. Art

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**H. E. 120 f or s. Advertising Layout and Store Coordination (2)**—Two laboratories. Prerequisite, H. E. 21 f or equivalent.

Lettering, elementary figure sketching and freehand perspective drawings applied to graphic advertising in the field of each student's major interest. Discussion of department and specialty store organization; lectures by retail executives from Baltimore and Washington.

**H. E. 121 f, 122 s. Interior Design (3, 3)**—First semester, two recitations, one laboratory; second semester, three laboratories. Prerequisite, H. E. 21 f or equivalent.

Study of traditional styles and design principles with relation to personalities in home planning and furnishing; trips to historic buildings;

special merchandise lectures showing what the market provides. In second semester floor plans and wall elevations are drawn to scale and rendered in color. Curtiss.

**H. E. 123 f, 124 s. Advanced Interior Design (2, 2)**—Two laboratories. Prerequisites, H. E. 21 f, H. E. 121 f, H. E. 122 s or equivalent.

Designing of rooms, including interior architecture, furniture, fabrics, accessories; scale drawing and color rendering in plan, elevation and perspective. A study of furniture manufacture and merchandising. Planning of exhibition rooms or houses when possible. Curtiss.

## HORTICULTURE

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Hort. 101 f, 102 s. Technology of Horticultural Plants (Fruits) (2, 2)**—Two lectures. Prerequisite, Plt. Phys. 101 f.

A critical analysis is made of research work in horticulture and allied work in plant physiology, chemistry, and botany, the results of which are interpreted with respect to their application in commercial production. Fundamental principles involved in growth, fruiting, storage, and quality of horticultural plants and products are stressed. Haut.

**Hort. 103 f, 104 s. Technology of Horticultural Plants (Vegetables) (2, 2)**—Two lectures. Prerequisite, Plt. Phys. 101 f.

These courses are described under Hort. 101.

**Hort. 105 f or s. Technology of Horticultural Plants (Ornamentals) (2)**—Two lectures. Prerequisite, Plt. Phys. 101 f.

A study of the physiological plant processes as related to the growth, flowering, storage, etc., of floricultural and ornamental plants. A critical analysis and interpretation of the result of research studies dealing with water relations, temperature relations, photoperiodism, rest period, soils, fertilizers, and mineral deficiencies on ornamental crops. The applications pertaining to commercial production receive special consideration.

**Hort. 106 s. World Fruits and Nuts (2)**—Two lectures.

A study of the tropical and subtropical fruits and nuts of economic importance. The orange, lemon, grapefruit, pineapple, banana, date, fig, olive, avocado, papaya, mango, walnut, pecan, almond, filbert, tung nut, Brazil nut, cashew, and cocoanut, receive consideration. Special emphasis is placed upon the botanical relationships, composition, varieties, climatic and cultural requirements, methods and problems of production, and the development and present commercial status of those grown in the United States and its possessions. Haut.

**Hort. 107 y. Plant materials (5)**—One lecture; one or two laboratories. (Not given in 1942-1943.)

A field or laboratory study of trees, shrubs, and vines used in ornamental planting. Thurston.

**Hort. 108 f or s. Canning Crops Technology (3)**—Two lectures; one laboratory. Prerequisite, Hort. 16 and Plt. Phys. 101 f. (Given in alternate years; not offered in 1941-1942.)

A course dealing with the more technical physico-chemical methods used in the study of the fundamentals or factors influencing the quality of raw products, physiological processes prior to and after blanching, and grade of processed product. In addition, studies will be made of new types of equipment and recent research on methods of processing. Visits to canning plants and commercial laboratories will be required.

Mahoney, Walls.

**Hort. 109 f or s. Systematic Pomology (3)**—Two lectures; one laboratory. (Given in alternate years; not offered in 1941-1942.)

A study of the origin, history, taxonomic relationships, description, pomological classification and identification of tree and small fruits.

Haut.

**Hort. 110 f or s. Systematic Olericulture (3)**—Two lectures; one laboratory.

A study of the classification and nomenclature of vegetable crops, and the description and identification of varieties. The adaptation of varieties to different environmental conditions and their special uses in vegetable production.

Walls.

#### COURSES FOR GRADUATES

**Hort. 201 A f, 201 B s. Experimental Pomology (2, 2)** — Two lectures. Prerequisite, Plt. Phys. 101 f.

A systematic study of the sources of knowledge and opinion as to practices in pomology; methods and difficulties in experimental work in pomology, and results of experiments that have been or are being conducted in all experiment stations in this and other countries.

Schrader.

**Hort. 202 A f, 202 B s. Experimental Olericulture (2, 2)**—Two lectures. Prerequisite, Plt. Phys. 101 f.

A critical study and interpretation is made of certain experimental work done on soils, fertilizers, water relations, light and temperature relations, rest period and dormancy, and anatomical and morphological studies which may be applied to the field of vegetable crops. Methods and techniques used in research are discussed.

Mahoney.

**Hort. 203 A f or s. Experimental Olericulture (2)**—Two lectures. Prerequisites, Zool. 120, Plt. Phys. 101 f, or equivalents.

A course dealing with the field of cyto-genetics in relation to horticulture.

Mahoney.

**Hort. 203 B s. Experimental Pomology (2)**—Two lectures.

A continuation of Hort. 201.

Schrader.

**Hort. 204 f or s. Methods of Horticultural Research (2)**—One lecture; one laboratory.



Methods in use by horticultural research workers in the United States and foreign countries are discussed in detail, critically evaluating such methods for use in solving present problems. Discussion of photographic technique, application of statistical procedures, physical measurements, plot designs, survey methods, and experimental materials will be emphasized.

**Hort. 205. Research**—Credit given according to work done.

Graduate students will be required to select problems for original research in pomology, vegetable gardening, or floriculture. These problems will be continued until completed and final results will be in the form of a thesis. Staff.

**Hort. 206 f, 207 s. Horticultural Seminar (1, 1).**

Oral reports with illustrative material are required on special topics or recent research publications in horticulture. Discussion by the students and staff members during and after each report is an essential part of the seminar. The aim of this course is to develop ability to analyze and to present research results orally as well as to review recent advances in horticulture. Staff.

## MATHEMATICS

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Math. 115 s. Applied Calculus for Chemists (3)**—Three lectures. Prerequisite Math. 23 y.

This course is conducted in close cooperation with the Chemistry Department, and deals with the aspects of mathematics which arise in the theory and practice of chemistry. Among the topics treated are the following: partial and total derivatives; applications of mathematical analysis to thermo-dynamics, to molecular and atomic phenomena, and to physical chemistry. Lancaster.

**Math. 116 f. Advanced Trigonometry (2)**—Two lectures. Prerequisite, Math 23 y or its equivalent.

Complex numbers; De Moivre, Euler and allied identities; trigonometric series and infinite products; graphing of periodic functions; hyperbolic trigonometry; trigonometric solution of equations; principles of spherical trigonometry. Dantzig.

**Math. 122 s. History of Elementary Mathematics (2)**—Two lectures. (Not given in 1941-1942.)

History of arithmetic, algebra and geometry. Dantzig.

**Math. 123 s. Vector Analysis (2)**—Two lectures. Prerequisite, Math. 142 s or its equivalent.

Scalars, vectors, matrices and determinants; transformations; linear dependence; canonical forms; elementary divisors; applications to geometry and mechanics. Alrich.



**Math. 130 f. Analytical Mechanics (2)**—Two lectures. Prerequisite, Math. 23 y.

Statics, equilibrium of a point and of flexible cords, virtual work, kinematics, dynamics of a particle, elementary celestial mechanics.

Martin.

**Math. 131 y. Analytical Mechanics (4)**—Two lectures. Prerequisite, Math. 130 f or its equivalent. (Not given in 1940-1941.)

Lagrangian equations for dynamical systems of one, two and three degrees of freedom; Hamilton's principle; the Hamilton-Jacobi partial differential equation.

Martin.

**Math. 140 y. Mathematical Seminar (4)**—Two sessions.

Required of graduate students. This course is devoted to special topics not taken up in the regularly scheduled courses.

Staff.

**Math. 141 f. Higher Algebra (2)**—Two lectures. Prerequisite, Math. 23 y, or equivalent.

Identities; multinomial expansion; combinatorial analysis; mathematical induction; undetermined coefficients; determinants; elementary theory of equations; complex magnitudes.

Lancaster.

**Math. 142 s. Higher Algebra (2)**—Two lectures. Prerequisite, Math. 141 f or its equivalent.

Inequalities; continued fractions; summation of series; difference equations; theory of numbers; diophantine equations.

Lancaster.

**Math. 143 f. Advanced Calculus (2)**—Two lectures. Prerequisite, Math. 23 y, or equivalent.

General methods of integration; multiple integration with physical applications, partial differentiation; geometrical and physical applications; mean value theorem; Jacobians; envelopes.

Titt.

**Math. 144 s. Advanced Calculus (2)**—Two lectures. Prerequisite, Math. 143 f or its equivalent.

Elliptic integrals; line integrals; Green's theorem; equation of continuity; applications to hydrodynamics.

Titt.

**Math. 145 f. Advanced Plane Analytic Geometry (2)**—Two lectures. Prerequisite, Math. 23 y, or equivalent. (Not given in 1941-1942.)

Homogeneous coordinates; advanced theory of conic sections; Plucker characters of algebraic curves; cubic and quartic curves; Cremona transformations.

Van Stockum.

**Math. 146 s. Solid Analytic Geometry (2)**—Two lectures. Prerequisite, Math. 145 f or equivalent. (Not given in 1941-1942.)

General theory of quadric surfaces; the twisted cubic; line geometry; geometry on a sphere; cubic and quartic surfaces.

Alrich.

**Math. 151 f. Theory of Equations (2)**—Two lectures. Prerequisite, Math. 23 y or equivalent.

Complex numbers; fundamental theorem of algebra; equations of the third and fourth degree; algebraic solution of equations; finite groups; numerical solution of equations; criteria of irreducibility; cyclometric equations. Lancaster.

**Math. 152 s. Introduction to Modern Algebra (2)**—Two lectures. Prerequisite, Math. 151 f or equivalent.

Vectors; matrices; linear dependence; quadratic forms; infinite groups. Lancaster.

**Math. 153 f. Advanced Differential Equations (2)**—Two lectures. Prerequisite, Math. 23 y or equivalent. (Not given in 1941-1942.)

Equations of the first order; linear equations with constant and variable coefficients; change of variables; singular solutions; solution in series; numerical integration; ordinary differential equations in three variables; partial differential equations. Titt.

**Math. 154 s. Topics in Analysis (2)**—Two lectures. Prerequisite, Math. 153 f or equivalent. (Not given in 1941-1942.)

Theory of vibrations; Fourier series; calculus of variations; entropy; improper integrals. Titt.

**Math. 155 f. Introduction to Projective Geometry (2)**—Two lectures. Prerequisite, Math. 23 y, or equivalent.

The theorems of Desargues and Pappus; cross-ratio and homography; projective theory of conics; projective interpretation and generalization of elementary geometry. Dantzig.

**Math. 156 s. Introduction to Differential Geometry (2)**—Two lectures. Prerequisite, Math 23 y, or equivalent.

Infinitesimal properties of plane curves; transformations; orthogonal trajectories; envelopes; roulettes and glissettes; curvilinear coordinates in the plane. Van Stockum.

**Math. 171 f. Applied Mathematical Analysis (2)**—Two lectures. Prerequisite, Math. 23 y, or equivalent.

Intended for advanced undergraduate and graduate students in engineering, mathematics, physics and chemistry. Ballistics, dynamical stability in flight, stress analysis, graphical statics, cryptography, and communications will be among the topics discussed. Titt.

#### COURSES FOR GRADUATES

**Math. 220 f. Theory of Functions of a Complex Variable (2)**—Two lectures. Prerequisites, Math. 143 f and Math. 144 s, or equivalent. (Not given in 1941-1942.)

Complex numbers, power series, integration of analytic functions, Cauchy integral formula, Cauchy theory of analytic functions; special analytic functions. Weyl.

**Math. 221 s. Theory of Functions of a Complex Variable (2)**—Two lectures. Prerequisite, Math. 220 f, or equivalent. (Not given in 1941-1942.)

Meromorphic functions; Weierstrass theory of analytic functions; analytic continuation and Riemann surfaces; conformal representation.

Newell.

**Math. 222 f. Theory of Functions of a Real Variable (2)**—Two lectures. Prerequisites, Math. 143 f and 144 s, or equivalent.

Real numbers, continuous functions, differentiable functions; uniform convergence; implicit functions; Jacobians; the Riemann integral; infinite series; dominant functions; real analytic functions.

Martin.

**Math. 224 s. Theory of Functions of a Real Variable (2)**—Two lectures. Prerequisite, Math. 222 f, or equivalent.

Point sets; Heine-Borel theorem; content and measure of point sets; the Lebesgue integral.

Martin.

**Math. 225 f. Projective Geometry (2)**—Two lectures. Prerequisite, Math. 155 f, or equivalent.

Axiomatic development of geometry; fundamental theorems; projective equivalence; the group of collineations in the plane and in space; non-Euclidean geometries.

Dantzig.

**Math. 226 s. Differential Geometry (2)**—Two lectures. Prerequisite, Math. 156 s, or equivalent.

Principles of vector analysis; skew curves, kinematical applications; geometry on a surface; general theory of surfaces; curvature and space structure; Riemannian geometries.

Van Stockum.

**Math. 227 f. Infinite Processes (2)**—Two lectures. Prerequisite, Math. 222 f, or equivalent.

Convergence of infinite series and products; Fourier series; orthogonal functions; asymptotic series.

Lancaster.

**Math. 231 s. Partial Differential Equations with Applications to Mathematical Physics (2)**—Two lectures. Prerequisites, Math. 143 f, Math. 144 s, and Math. 153 f, or equivalent.

Partial differential equations of the first and second order; linear equations; total differential equations; equations of the Monge-Ampere type; the Laplace equation; harmonics; applications to electricity, heat, elasticity, and hydro-dynamics; potential theory.

Titt.

**Math. 232 s. Theory of Probabilities and Least Squares (2)**—Two lectures. Prerequisite, Math. 23 y, or equivalent.

Frequency and probability; the concept of "equally likely;" combinatorial analysis; addition and multiplication theorems; frequency of distribution; continuous probabilities; applications to statistics, to theories of errors and correlation, and to molecular theories.

Titt.

**Math. 235 s. Modern Algebra (2)**—Two lectures. Prerequisite, Math. 152 s, or equivalent.

Sets; classes; groups; isomorphism; rings; fields; Galois theory; ordered and well-ordered sets; ideals; linear algebras. Newell.

**Math. 240 y. Graduate Colloquium.**

A forum for the presentation and critical discussion of mathematical research conducted by the faculty and advanced students.

**Math. 250 y. Seminar in the History of Mathematics (4)**—Two lectures. Prerequisite, Math. 23 y, or equivalent.

Celebrated problems of mathematics from antiquity to our own days. History of individual mathematical disciplines, such as the theory of numbers, non-Euclidean geometry, vector and matrix analysis, theory of functions, theory of groups, theory of aggregates. Special emphasis will be laid on the evolution of mathematical concepts and principles. Dantzig.

### Selected Topics Courses

In addition to the preceding, a number of courses will be offered from time to time by the various members of the staff in their respective fields of specialization. These courses are intended primarily for candidates for advanced degrees and aim at developing materials for dissertations; they will, however, be open to any qualified student.

**Math. 242. Selected Topics in Modern Geometry.** Dantzig, Van Stockum.

**Math. 243. Selected Topics in Modern Analysis.**  
Martin, Lancaster, Newell.

**Math. 244. Selected Topics in Dynamics.** Martin.

**Math. 245. Selected Topics in Mathematical Physics.** Van Stockum, Titt.

**Math. 246. Selected Topics in Applied Mathematics.** Dantzig, Alrich.

**Math. 247. Selected Topics in Differential and Difference Equations.**  
Lancaster.

**Math. 260. Research.** Investigation of special problems and the preparation of a thesis towards an advanced degree. Staff.

## MODERN LANGUAGES

### A. French

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**French 102 y. French Literature of the Seventeenth Century (4)**—Two lectures. Wilcox.

French 103 y. French Literature of the Eighteenth Century (4)—Two lectures. Falls.

French 104 y. French Literature of the Nineteenth Century (4)—Two lectures. Wilcox.

French 105 y. French Literature of the Twentieth Century (4)—Two lectures. Falls.

French 110 y. Advanced Composition (6)—Three lectures. Prerequisite, French 10 y. Falls.

Attention is also called to Comparative Literature 105 f, Romanticism in France.

#### COURSES FOR GRADUATES

French 201. Research. Credits determined by work accomplished.

French 202 y. Diderot and the Encyclopaedists (4)—Two lectures. Falls.

French 204 y. Georges Duhamel, Poet, Dramatist, Novelist (4)—Two lectures. (Not given in 1941-1942.) Falls.

French 205 y. French Literature of the Middle Ages and the Renaissance (4)—Two lectures. Darby.

French 206 f, 207 s. The French Novel in the First Half of the Nineteenth Century (2, 2)—Two lectures. (Not given in 1941-1942.) Falls.

French 208 f, 209 s. The French Novel in the Second Half of the Nineteenth Century (2, 2)—Two lectures. Falls.

French 210 y. Seminar (2-4)—One meeting weekly. Required of all graduate students in French.

French 212 s. Introduction to Old French (2)—Two lectures. Darby.

French 220 f, 221 s. Reading Course (2, 2)—One conference.

Designed to give graduate students the background of a survey of French literature. Extensive outside reading with reports and connecting lectures. Falls.

#### B. German

##### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

German 101 f. German Literature of the Eighteenth Century (3)—Three lectures. (Not given in 1941-1942.)

The earlier classical literature. Prahl.



German 102 s. German Literature of the Eighteenth Century (3)—Three lectures.

The later classical literature. Prahl.

German 103 f. German Literature of the Nineteenth Century (3)—Three lectures.

Romanticism in Young Germany. Prahl.

German 104 s. German Literature of the Nineteenth Century (3)—Three lectures.

The literature of the Empire. Prahl.

German 105 f, 106 s. Contemporary German Literature (3, 3)—Three lectures.

A study of the lives, works and influence of outstanding authors of the present. Prahl.

German 107 y. Goethe's *Faust* (4)—Two lectures. Zucker.

Attention is called to Comparative Literature 106 s, Romanticism in Germany, and Comparative Literature 107 f, The Faust Legend in English and German Literature.

#### COURSES FOR GRADUATES

German 201. Research. Credits determined by work accomplished.

German 202 y. The Modern German Drama (4)—Two lectures.

Study of the naturalistic, neo-romantic, and expressionistic drama against the background of Ibsen and other international figures. Prahl.

German 203 y. Schiller (4)—Two lectures. (Not given in 1941-1942.)

Study of the life and works of Schiller with special emphasis on the history of his dramas. Prahl.

German 204 f. Goethe's *Faust* (2)—Two lectures. (Not given in 1941-1942.) Zucker.

German 205 s. Goethe's Works outside of *Faust* (2)—Two lectures.

Zucker.

German 206 y. The Romantic Movement (2)—Two lectures. Prahl.

German 210 y. Seminar (2-4)—Two meetings weekly. Required of all graduate students in German.

Subject for 1941-1942: Grill Parzer. Zucker.

German 220 f, 221 s. Reading Course (2, 2)—One conference.

Designed to give graduate students the background of a survey of German literature. Extensive outside reading with reports and connecting lectures. Prahl.

German 230 f. Introduction to Indo-European Linguistics (3).  
Mutziger.

German 231 s. Middle High German (3)—Three lectures. Mutziger.

### C. Spanish

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

Spanish 101 f. Spanish Literature of the Twentieth Century (3)—Three lectures.

Novels, the drama, essays, and poetry. Darby.

Spanish 103 f. The Spanish Drama (3)—Three lectures. (Not given in 1941-1942.)

The drama of the Golden Age. Darby.

Spanish 104 s. The Spanish Drama (3)—Three lectures. (Not given in 1941-1942.)

Continuation of Spanish 103 f. The drama since Calderon. Darby.

Spanish 105 y. Cervantes (6)—Three lectures.

The life and times of Cervantes; principal prose works. Darby.

Spanish 107 f. The Spanish Novel (3)—Three lectures.

Classic novels and short stories of the Golden Age and of the eighteenth century. Darby.

Spanish 108 s. The Spanish Novel (3)—Three lectures.

Continuation of Spanish 107 f. A study of the development of the modern novel. Darby.

Spanish 110 s. Advanced Composition (3)—Three lectures. Prerequisite, Spanish 6 y or consent of the instructor.

Extensive practice in composition and grammar for students who are completing major or minor requirements in Spanish. Conducted in Spanish. Darby.

Spanish 151 f. Latin-American Literature: The Colonial Period (3)—Three lectures. (Not given in 1941-1942.) Darby.

Spanish 152 s. Latin-American Literature: The Modern Period (3)—Three lectures. (Not given in 1941-1942.) Darby.

#### COURSES FOR GRADUATES

Spanish 201. Research. Credits determined by work accomplished.  
Staff.

Spanish 202 y. The Golden Age in Spanish Literature (6)—Three lectures.

Detailed study of the classical authors. Darby.

**Spanish 203 f. Spanish Poetry (3)**—Three lectures. (Not given in 1941-1942.)

The epic, the ballad and popular poetry, early lyrics, poetry of the Golden Age. Darby.

**Spanish 204 s. Spanish Poetry (3)**—Three lectures. (Not given in 1941-1942.)

Continuation of Spanish 203 f. Poetry of the eighteenth, nineteenth, and twentieth centuries. Darby.

**Spanish 210 y. Seminar (2-4)**—One meeting weekly.

Required of all graduate students in Spanish.

**Spanish 212 f. Introduction to Old Spanish (2)**—Two lectures. Darby.

**Spanish 220 f, 221 s. Reading Course (2, 2)**—One conference.

Designed to give graduate students the background of a survey of Spanish literature. Extensive outside reading with reports and connecting lectures. Darby.

## PHILOSOPHY

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Phil. 111 f, 112 s. Readings in Philosophy (1, 1)**—One hour of discussion. Prerequisite, Phil. 1 f or 2 s.

One or several relatively easy philosophical works will be read, and discussed in class. The topic will be changed from semester to semester. Not more than two credits allowed to any one student. Marti.

**Phil. 113 f, 114 s. Readings in Philosophy (1, 1)**—One hour of discussion. Prerequisite, Phil. 1 f or 2 s. (Not given in 1941-1942.)

Similar to Phil. 111 f, 112 s.

Marti.

**Phil. 151 f. Proseminar in Aesthetics (3)**—Two hours of proseminar, one hour of tutorial work. Prerequisite, two courses in philosophy.

An intensive study of some important book on, or system of, aesthetics, or of the development of aesthetic theory of some historical period; or a testing study of the principles of literary and artistic criticism. The topic will be changed from year to year, and will be chosen in line with the needs of the group participating. Marti, Weeks.

**Phil. 152 s. Proseminar in Philosophy of History (3)**—Two hours of proseminar, one hour of tutorial work. Prerequisite, two courses in philosophy.

An intensive study of some important book on, or phase of, the philosophy of history; or a study of the philosophical implications of some period of history, or the philosophical significance of certain sociological

trends or theories. The topic will be changed from year to year, and will be chosen in line with the needs of the group participating.

Marti, Thatcher.

**Phil. 191 f, 192 s. Systems of Philosophy (3)**—Three hours of lectures, student reports, and discussion. Prerequisite, two courses in philosophy, and the permission of the professor.

The system of one philosopher, or the development of one movement, will be studied throughout each semester. The topic will be changed from semester to semester, in line with the needs of the students enrolled.

Marti.

**Phil. 193 f. 194 s. Systems of Philosophy (3)**—Three hours of lectures, student reports, and discussion. Prerequisite, two courses in philosophy, and the permission of the professor. (Not given in 1941-1942.)

Similar to Phil. 191 f, 192 s.

Marti.

## PHYSICS

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Phys. 101 f. Precision of Measurements (3)**—Three lectures. Prerequisites, Phys. 2 y, or Phys. 1 y and Math. 23 y.

A discussion of the principles underlying the treatment of experimental data, as to precision of observations, errors, interpolation, curve analysis, etc., with special emphasis on the planning of investigations involving measurements. The course is intended as an introduction to quantitative experimental work.

Eichlin.

**Phys. 102 s. Physical Measurements (3)**—Two lectures, one laboratory. Prerequisite, Phys. 101 f.

This course, supplementing Phys. 101 f, is designed to familiarize the student with the manipulation of various types of apparatus used in experimentation in physical problems, and the adaptation and analysis of data so obtained.

Eichlin.

**Phys. 103 y. Advanced Physics (6)**—Three lectures. Prerequisite, Phys. 1 y.

This course, supplementing Phys. 1 y, is an advanced study of physical phenomena in optics, spectroscopy, conduction of electricity through gases, photoelectricity, etc., with a comprehensive review of basic principles involved. It is intended to familiarize the student in a general survey with some of the recent developments in physics.

Smith.

**Phys. 104 y. Advanced Experiments (6)**—One lecture, two laboratories. Prerequisite, Phys. 103 y. (Not given in 1941-1942.)

This course, supplementing Phys. 1 y, is intended to provide the student with experience in experimental physics.

Myers.

**Phys. 105 f. Heat (3)**—Two lectures, one laboratory. Prerequisite, Phys. 2 y, or Phys. 1 y and Math. 23 y. Myers.

The classical phenomena of heat and radiation are developed on the basis of the kinetic molecular theory and the quantum theory. The first and second laws of thermodynamics are applied to physical processes.

Myers.

**Phys. 106 s. Theoretical Mechanics (3)**—Three lectures. Prerequisites, Phys. 2 y, or Phys. 1 y and Math. 23 y.

An analytical treatment of the fundamental principles of kinematics and dynamics is presented with problems to illustrate these principles. The use of generalized coordinates is illustrated. The equations of Lagrange are applied to selected topics in the field of dynamics.

Myers.

**Phys. 107 s. Optics (3)**—Two lectures, one laboratory. Prerequisites, Phys. 2 y, or Phys. 1 y and Math. 23 y.

A study is made of selected topics in the refraction, reflection, interference, diffraction and polarization of light. The principles are employed in a detailed study of optical systems of telescope, microscope, spectroscope and interferometer.

Dickinson.

**Phys. 108 y. Electricity (6)**—Two lectures, one laboratory. Prerequisites, Phys. 2 y, or Phys. 1 y and Math. 23 y.

A study of electrical properties of matter and space with applications to common electrical instruments and apparatus.

Dickinson.

**Phys. 109 y. Electron Physics (6)**—Two lectures, one laboratory. Prerequisites, Phys. 2 y, or Phys. 1 y and Math. 23 y.

The discrete nature of matter, electricity and radiation is emphasized from an empirical point of view. The determination of the fundamental electronic and molecular constants is treated in detail. The process of electrical discharge through gas and vacuum is ramified to include discussion of radioactivity, photoelectricity, thermionics and atomic structure.

Myers.

**Phys. 110 f. Sound (3)**—Two lectures, one laboratory. Prerequisites, Phys. 2 y, or Phys. 1 y and Math. 23 y. (Not given in 1941-1942.)

A study is made of vibrating systems, the propagation and scattering of sound waves, standing sound waves, sound wave energy, etc.

Myers.

**Phys. 111 f, 112 s. Mathematical Physics (3, 3)**—Three lectures. Prerequisites, Phys. 2 y, or Phys. 1 y and Math. 23 y.

Selected topics in physics will be treated to illustrate certain mathematical methods, particularly the use of derivatives and differentials, methods of integration, infinite series, vectors, ordinary and partial differential equations, orthonormal sets of functions.

Myers.

**Phys. 113 f, 114 s. Properties of Matter (3, 3)**—Three lectures. Prerequisites, Phys. 2 y, or Phys. 1 y and Math. 23 y. (Not given in 1941-1942.)



A study of the constituent particles of matter and such properties of matter as gravitation, molecular attraction, elasticity, special properties of solids and of fluids at rest and in motion, wave propagation. Eichlin.

**Phys. 115 f, 116 s. High Frequency Phenomena (3, 3)**—Two lectures, one laboratory. Prerequisites, Phys. 2 y, or Phys. 1 y and Math. 23 y. (Not given in 1941-1942.)

A study of resonant circuits, characteristics of electron tubes, high frequency generators, filters, electromagnetic waves, propagation of waves in wires and through a conducting medium. Dickinson.

#### COURSES FOR GRADUATES

**Phys. 201 f. Atomic Structure (3)**—Three lectures.

A development of atomic theory by a discussion of the various atomic properties, particularly those of emission of spectra, scattering of X-rays and electrons, and valency. Myers.

**Phys. 202 f. Atomic Spectra (3)**—Three lectures.

An interpretation of special series, fine and hyperfine structure, line intensities and polarization, line contours, and effects of external fields in light of modern atomic theory. Myers.

**Phys. 203 s. Molecular Spectra (3)**—Three lectures.

A discussion of molecular spectra with particular reference to the information that is given about molecular structure, specific heats, entropy, and related phenomena. Myers.

**Phys. 204 f, 205 s. Quantum Mechanics (3, 3)**—Three lectures.

A treatment of the general methods of quantum mechanics will applications to the theory of atomic and molecular structure, the theory of collision processes, and the theories of radiation and electro-dynamics. Myers.

**Phys. 206 s. Nuclear Structure (3)**—Three lectures.

The theory of the nucleus is developed by a discussion of masses, charges, magnetic moments, radioactivity, nuclear reactions, scattering, and interaction with radiation fields. Myers.

**Phys. 207 f, 208 s. Modern Physics (3, 3)**—Three lectures.

A comprehensive survey of developments in physics leading to recent concepts of atomic structure, theory of radiation, interaction of radiation and matter, quantum theory, relativistic mechanics, cosmology. Dickinson.

**Phys. 209 f, Dynamics I (3)**—Three lectures. (Not given in 1941-1942.)

A treatment of dynamical systems in generalized coordinates by the equations of Lagrange, of Hamilton, and of Hamilton-Jacobi, by the Hamiltonian Principle, and by the use of canonical transformations. Myers.

**Phys. 210 s. Dynamics II (3)**—Three lectures. (Not given in 1941-1942.)

A derivation of the equations of motion of a fluid, a study of irrotational motion, vortex motion, motion of solids through liquids, waves through liquids, viscosity. Myers.

**Phys. 211 f. Electrodynamics (3)**—Three lectures. (Not given in 1940-1941.)

The electric and magnetic fields; properties of dielectrics; properties of electric conductors; electromagnetic induction; electromagnetic radiation; dispersion theory; electro- and magneto-optics. Dickinson.

**Phys. 212 s. Physical Optics (3)**—Three lectures. (Not given in 1940-1941.)

A mathematical study of the electromagnetic theory of light, with applications to interference, diffraction, dispersion, and polarization. Dickinson.

**Phys. 213 f, 214 s. Theory of Elasticity (3, 3)**—Three lectures.

A comprehensive discussion of the development of theoretical concepts of elasticity with particular attention to torsion, stresses in beams, curved bars, thin plates, stresses produced by dynamical causes, propagation of waves in solid media. Eichlin.

**Phys. 215 f, 216 s. X-ray and Crystal Structure (3, 3)**—Three lectures. (Not given in 1941-1942.)

A discussion of the production and measurement of X-rays with the application of X-ray methods to the study of the physical properties of crystals.

**Phys. 217 y. Seminar (2).**

Presentation of reports and discussion of current development in physics and of original investigations on special problems. Staff.

## POLITICAL SCIENCE

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Pol. Sci. 101 f. International Relations (3).** Prerequisite, Pol. Sci. 1 or consent of instructor.

The course deals with the major factors underlying international relations, the influence of geography, climate, nationalism and imperialism, and the development of international organizations. Leath.

**Pol. Sci. 102 s. International Law (3).** Prerequisite, Pol. Sci. 1.

A study of the principles governing international intercourse in time of peace and war, as illustrated in texts and cases. Leath.

**Pol. Sci. 104 s. Recent Far Eastern Politics (3).** Prerequisite, Pol. Sci. 1 or consent of instructor.

The background and interpretation of recent political events in the Far East and their influence on world politics. Steinmeyer.

**Pol. Sci. 105 f. Problems of World Politics (3).** Prerequisite, Pol. Sci. 1 or consent of instructor.

The course deals with governmental problems of an international character, such as causes of war, problems of neutrality, propaganda, etc. Students are required to report on readings from current literature. Steinmeyer.

**Pol. Sci. 111 f. Principles of Public Administration (3).** Prerequisite, Pol. Sci. 4, or consent of instructor.

A functional study of public administration in the United States, with special emphasis upon organization and the relation of administration to the other branches of government. Howard.

**Pol. Sci. 112 s. Public Personnel Administration (3).** Prerequisite, Pol. Sci. 111 f or consent of instructor.

A study of civil service practices in the United States with particular reference to the organization of the personnel agency, the classification and compensation plans, the selection of employees and the management of personnel. Howard.

**Pol. Sci. 113 f. Municipal Government and Administration (3).** Prerequisite, Pol. Sci. 4.

A detailed study of selected problems of municipal government, such as housing, health, zoning, fire and police, recreation and planning. Course includes a visit to Baltimore to observe the agencies of city government at work. Kline.

**Pol. Sci. 114 s. Public Budgeting (3).** Prerequisite, Pol. Sci. 111 f or consent of instructor. (Not offered in 1941-1942.)

A study of budgetary administration in the United States, including systems of financial control and accountability, the settlement of claims, centralized purchasing and the reporting of financial operations. Howard.

**Pol. Sci. 117 f, 118 s. Government at Work (3, 3)**—One lecture and two field trips. Prerequisites, Pol. Sci. 1 and consent of instructor.

This course consists of visits to various administrative agencies of the national government, supplemented by reading assignments on the work of the agencies visited. Howard.

**Pol. Sci. 121 f. Political Parties and Public Opinion (3).** Prerequisite, Pol. Sci. 1.

A descriptive and critical examination of the party process in government; nominations and elections, party expenditures, political leadership, the management and conditioning of public opinion.

**Pol. Sci. 123 f. Government and Business (3).** Prerequisite, Pol. Sci. 1.

A general survey of governmental activities affecting business, with special emphasis upon recent developments; federal and state assistance to and regulation of business in their historical and legal aspects; government ownership and operation. Bone.

**Pol. Sci. 124 s. Legislatures and Legislation (3).** Prerequisite, Pol. Sci. 4.

A comprehensive study of the legislative process, bicameralism, the committee system and the lobby, with special emphasis upon the legislature of Maryland. The course includes a visit to Washington to observe Congress at work. Bone.

**Pol. Sci. 126 s. Government and Social Security (2).** Prerequisite, Pol. Sci. 4.

An analysis of the federal Social Security Act with special emphasis upon its background, purposes, administration, and deficiencies. Attention will be given also to employment assurance and relief policies, and to the efforts of European countries and the forty-eight states to provide a greater measure of security. Bone.

**Pol. Sci. 131 f. Constitutional Law (3).** Prerequisite, Pol. Sci. 1.

A systematic inquiry into the general principles of the American constitutional system, with special reference to the role of the judiciary in the interpretation and enforcement of the Constitution, the position of the states in the federal system, state and federal powers over interstate and foreign commerce, and the rights of citizens and of accused persons. Kline.

**Pol. Sci. 134 s. Administrative Law (3).** Prerequisite, Pol. Sci. 1.

A study of the principles involved in the expansion of the discretion of administrative boards and commissions, including an analysis of their functions, their powers over private rights, their procedure in making findings, the enforcement of their rules and orders and judicial control of their actions. Kline.

**Pol. Sci. 136 s. Elements of Law (3).** Prerequisite, Pol. Sci. 1.

Development of law and legal systems; comparison of methods and procedure in making and enforcing law in Roman and common law systems; consideration of fundamental legal concepts; contribution and influence of modern schools of legal philosophy in relation to law and government. Walther.

**Pol. Sci. 138 s. Law Enforcement (2).** Prerequisite, Pol. Sci. 1.

A survey of the organization and operation of the agencies involved in the administration of criminal justice, with special reference to the organization and methods of police departments, problems of organized crime and its suppression, the role of the prosecutor and the courts, and the interrelations between these agencies. Kline.

**Pol. Sci. 141 f. History of Political Theory (3).** Prerequisite, Pol. Sci. 1 or consent of instructor.

A survey of the principal political theories set forth in the works of writers from Plato to Bentham. Walther.

**Pol. Sci. 142 s. Recent Political Theory (3).** Prerequisite, Pol. Sci. 1 or consent of instructor.

A study of recent political ideas, with special emphasis upon theories of socialism, communism, fascism, etc. Walther.

**Pol. Sci. 144 s. American Political Theory (3).** Prerequisite, Pol. Sci. 1 or consent of instructor. (Not offered in 1941-1942.)

A study of the writings of the principal American political theorists from the colonial period to the present. Walther.

#### COURSES FOR GRADUATES

**Pol. Sci. 201 f. Seminar in International Organization (2).**

A study of the forms and functions of various international organizations. Steinmeyer.

**Pol. Sci. 202 s. British Empire (3).** (Not offered in 1941-1942.)

A study of the constitutional development of the British dominions, with particular attention to recent inter-imperial relationships. Steinmeyer.

**Pol. Sci. 211 y. Seminar in Federal-State Relations (4).**

Reports on topics assigned for individual research in the field of recent federal-state relations. Howard.

**Pol. Sci. 213 f. Problems of Public Administration (2).** (Not offered in 1941-1942.)

Reports on topics assigned for individual research in the field of national and state administration. Howard.

**Pol. Sci. 214 s. Problems of Personnel Administration (2).** (Not offered in 1941-1942.)

Reports on topics assigned for individual research in the field of public personnel administration. Howard.

**Pol. Sci. 216 s. Problems of Government in Metropolitan Regions (2).**

Analysis of some metropolitan areas and some of the most pressing problems arising out of the existence of dense populations spread over a large number of small governmental units having similarly inadequate powers and facilities to cope with the problems involved; discussion of possible solutions. Kline.

**Pol. Sci. 221 f. Seminar in Public Opinion (2).**

Reports on topics assigned for individual research in the field of public opinion. Bone.



**Pol. Sci. 222 s. Psych. 280 s. Analysis of Propaganda (3)**—Two lectures and one discussion. Prerequisite, consent of instructors.

Analytical approach to modern propaganda, including study of organizations which employ propaganda, of techniques in actual use in disseminating propaganda, and of attempts at measuring the effects of propaganda. Responsibility for instruction is shared by the Department of Political Science and the Department of Psychology. Bone, Jenkins.

**Pol. Sci. 235 f. Problems in Public Law (2).**

Readings and reports on topics selected with reference to the needs of the individual student; special attention will be given to methods of research in legal materials and to problems in interstate commerce, police power, due process and equal protection. Kline.

**Pol. Sci. 251 f. Bibliography of Political Science (2).**

This course is intended to acquaint the student with the literature of the various fields of political science and to instruct him in the use of government documents. Staff.

**Pol. Sci. 261. Research in Political Science.** Credit according to work accomplished. Staff.

## POULTRY HUSBANDRY

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Poultry 101 s. Poultry Genetics (3)**—Three lectures, demonstration, quiz periods. Prerequisites, Poultry 3 f and Zool. 104 f.

The inheritance of morphological and physiological characters of poultry; inheritance of factors related to egg and meat production and quality. Staff.

**Poultry 102 s. Poultry Nutrition (2)**—One lecture, one two-hour laboratory, demonstration, quiz. Prerequisite, Poultry 1 f and 2 s.

The nutritive requirements of poultry and the nutrients which meet those requirements; feed cost of poultry production. Bird.

**Poultry 104 y. Poultry Products Marketing Problems (4)**—Two lectures, demonstration, quiz periods. Prerequisite, Poultry 1 f and 2 s.

This course includes material on egg and meat quality, commercial grades, relation of transportation and distribution to quality, and methods of marketing, especially as related to quality. Gwin.

**Poultry 106 f. Poultry Physiology (1 or 2)**—One lecture, one two-hour laboratory. Prerequisite, Poultry 101 s.

The physiology of development and incubation of the embryo, especially physiological pathology of the embryo in relation to hatchability. Physiology of growth and the influence of environmental factors on growth and development. Byerly.

**Poultry 107 f. Poultry Industrial and Economic Problems (2)**—Two lectures.

This course presents the relation of poultry to agriculture as a whole, and its economic importance. Consumer prejudices and preferences, production, transportation, storage, and distribution problems, trends in the industry, surpluses and their utilization, poultry by-products and disease problems, are presented. Staff.

#### COURSES FOR GRADUATES

**Poultry 201 s. Advanced Poultry Genetics (3)**—Three lectures. Prerequisite, Poultry 101 s or equivalent.

This course serves as a foundation for research in poultry genetics. Linkage, crossing-over, inheritance of sex, the expression of genes in development, inheritance of resistance to disease and the influence of the environment on the expression of genetic capacities are considered. Jull.

**Poultry 202 f. Advanced Poultry Nutrition (3)**—Two lectures, one laboratory. Prerequisite, Poultry 102 or equivalent.

Deficiency diseases of poultry; vitamin, mineral and protein deficiencies. Synthetic diets, metabolism and the physiology of digestion, growth curves and their significance, and feed efficiency in growth and egg production. Bird.

**Poultry 203 s. Physiology of Reproduction of Poultry (3)**—Two lectures, one two-hour laboratory.

The role of the endocrines in reproduction, especially with respect to egg production. Fertility, sexual maturity, broodiness, molting, egg formation, ovulation, deposition of egg envelopes and the physiology of oviposition. Byerly.

**Poultry 204 f and s. Seminar (1).**

Reports of current researches by staff members, graduate students and guest speakers. Staff.

**Poultry 205 f and s. Poultry Literature (1-4).**

Readings on individual topics, oral and written reports, methods of analysis and presentation of scientific material. Staff.

**Poultry 206. Research in Poultry.**

Research with poultry may be conducted under the supervision of staff members toward the requirements for advanced degrees. Staff.

## PSYCHOLOGY

## COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Psych. 110 f or s. Advanced Educational Psychology (3).** Prerequisite, Psych. 10.

More advanced treatment of the solution of basic psychological problems in education by methods of controlled observation. Sprowls.

**Psych. 115 f. Detection and Treatment of Defects in Reading (3).** Prerequisite, Psych. 1 and permission of the instructor.

A survey of the psychological problems involved in the discovery and treatment of reading defects at the college level. Macmillan.

**Psych. 120 f. Psychology of Individual Differences (3).** Prerequisite, Psych. 1 or 10.

The occurrence, nature, and causes of psychological differences between individuals, methods of measuring these differences, and their importance in education, business and industry. Hackman.

**Psych. 121 s. Social Psychology (3).** Prerequisite, Psych. 1.

Results of researches on behavior in social settings; experimental studies of the effects of group membership, of the family, and of current social forces. Jenkins.

**Psych. 125 f. Child Psychology (3).** Prerequisite, Psych. 1 or 10.

Experimental analysis of child behavior; motor and intellectual development; emotions; social behavior; parent-child relationships; and problems of the growing personality. Clark.

**Psych. 130 f and s. Mental Hygiene (3)**—Two lectures and one clinic. Prerequisite, Psych. 1 or 10.

The more common deviations of personality; typical methods of adjustment. Sprowls.

**Psych. 131 s. Abnormal Psychology (3)**—Two lectures and one clinic. Prerequisite, Psych. 130.

The nature, occurrence, and causes of psychological abnormality with emphasis on the clinical rather than theoretical aspects. Sprowls.

**Psych. 140 f. Psychological Problems in Market Research (3).** Prerequisite, Psych. 3 s or permission of instructor.

Use of methods of controlled observation in determining public reactions to merchandise, and in measuring the psychological influences at work in particular markets. Jenkins.

**Psych. 141 s. Psychology in Advertising and Selling (3).** Prerequisite, Psych. 3 s.

Experimental and statistical studies of psychological aspects of advertising; methods of measuring the effectiveness of advertising; the role

of such factors as attention, memory, belief, etc.; problems associated with specific advertising media. Hackman.

**Psych. 150 s. Psychological Tests and Measurements (3)**—Two lectures and one laboratory period. Prerequisite, Psych. 120 f or permission of instructor.

Critical survey of psychological tests used in vocational orientation and in industry with emphasis on methods by which such tests are validated; practice in the use of tests and the interpretation of test data. Macmillan.

**Psych. 155 s. Vocational Orientation (3).** Prerequisite, Psych. 150 s or equivalent.

Psychological methods and results for occupational classification, and for worker selection, classification, and individual orientation. Bellows.

**Psych. 160 f. Industrial Psychology (3).** Prerequisite, Psych. 3 s or permission of instructor.

Controlled observation applied to psychological problems in industrial production, including psychological effects of conditions and methods of work. Hackman.

**Psych. 161 s. Personnel (3).** Prerequisite, Psych. 3 s or permission of instructor.

Psychological problems involved in the management of personnel in modern business and industry. A consideration of employee selection, measures of ability, methods of developing and maintaining personal efficiency and morale. Clark.

**Psych. 162 f. Advanced Personnel Psychology (3)**—Lectures and field periods. Prerequisite, Psych. 161 f.

Actual participation in industrial and governmental personnel programs, together with periodic discussions of the principles involved. Intended primarily for students planning to enter personnel administration. Clark.

**Psych. 165 s. Psychobiological Problems in Aviation (3).** Prerequisite, Psych. 120 f or permission of instructor.

Study of researchers dealing with human response to conditions met during flight. Selection and classification of flight personnel. Effects of high altitudes and accelerations. Effects of noise, fatigue and other conditions. Problems of tension and emotion. Jenkins.

**Psych. 170 f. Legal Psychology (3).** Prerequisite, Psych. 121 s or permission of instructor.

Interpretation of researches pertaining to accuracy of observation and of testimony, psychological aids in determination of guilt, and treatment of the offender. Sprowls.

**Psych. 190 y. Techniques of Investigation in Psychology (6)**—Three periods of practice and discussion. Prerequisite, Psych. 3 s.

A consideration of quantitative methods in psychology, the design of experiments, and actual practice in various methods of obtaining data and in treating these results for interpretation. Hackman.

#### COURSES FOR GRADUATES

**Psych. 200. Research in Psychotechnology.** Credit apportioned to work accomplished. Staff.

**Psych. 210 y. Seminar in Educational Psychology (6).**

An advanced course for teachers and prospective teachers. Systematic approach to advanced problems in educational psychology based upon specific experimental contributions. Sprowls.

**Psych. 240 y. Seminar in Current Psychotechnological Problems (6).**

A systematic analysis of recent contributions in selected psychotechnological fields. Jenkins.

**Psych. 245 f. Advanced Psychological Problems in Market Research (3).**

A study of the specialized problems and techniques employed by the psychologist in market research. The course will attempt to combine systematic theory with actual practice in dealing with these research problems. Jenkins.

**Psych. 250 y. Participation in Testing Clinic (4-6).** Credit apportioned to work accomplished.

Actual practice in the administration of tests of aptitude, interest, and achievement, and interpretation of test data in the course of routine operation of the testing bureau. Bellows.

**Psych. 251 s. Development and Validation of Psychological Tests (3).** Prerequisite, Psych. 150 s.

Methods for evaluating criteria and for the analysis and combination of test and predictor items. Bellows.

**Psych. 255 s. Occupational Psychology (3).** Prerequisite, consent of instructor.

Experimental development and use of the vocational counseling interview, aptitude tests, and related techniques for the occupational orientation of youth. Bellows.

**Psych. 280 s. Pol. Sci. 222 s. Analysis of Propaganda (3)**—Two lectures and one discussion. Prerequisite, consent of instructors.

Analytical approach to modern propaganda, including study of organizations which employ propaganda, of techniques in actual use in dissemination of propaganda, and of attempts at measuring the effects of propaganda. Responsibility for instruction is shared by the Department of Political Science and the Department of Psychology. Bone, Jenkins.



**Psych. 209 f. Problems of Experimental Design in Psychology (3).**  
Prerequisite, consent of instructor.

Application of advanced research techniques to specific fields in psycho-  
technology, with actual practice in their use. Hackman.

## SOCIOLOGY

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Soc. 101 f. Social Organization (2)**—Two lectures. Prerequisite, Soc.  
3 f and 4 s.

A systematic analysis of the forms of organization common to basic  
social institutions; variations of these forms in time and space; classifi-  
cation of forms of organization; conditioning factors of organizational  
forms; application of findings to contemporary problems. Joslyn.

**Soc. 102 s. Community Organization (3)**—Two lectures, one discussion.  
Prerequisite, Soc. 3 f and 4 s.

An analysis of the community and its component social groups;  
ecological basis of the community; determination of the boundaries of  
communities and neighborhoods; characteristics of rural and urban com-  
munities; social institutions of the community; social change and the  
community; the structure and functions of special interest groups; the  
community council. Dodson.

**Soc. 103 f. Rural Sociology (3)**—Two lectures, one discussion. Pre-  
requisite, Soc. 3 f and 4 s.

The structure and functions of rural communities; the evolution of  
rural culture; rural institutions and their problems; the psychology of  
rural life; composition and characteristics of the rural population; rela-  
tion of rural life to the major social processes; the social aspects of  
rural planning. Holt.

**Soc. 104 s. Urban Sociology (3)**—Two lectures, one discussion. Prereq-  
uisite, Soc. 3 f and 4 s.

The origin and growth of cities; composition and characteristics of city  
populations; the social ecology of the city; social relationships and  
groupings in the city; the organization of urban activities; social prob-  
lems of the city; the planning and control of urban development. Holt.

**Soc. 105 f. Population Problems (3)**—Two lectures, one discussion.  
Prerequisite, Soc. 3 f and 4 s. (Not offered in 1941-1942.)

Population growth in the United States; contemporary trends in  
fertility and mortality; differential fertility and mortality; changes in the  
composition of our population and their significance; population migration  
in modern times; qualitative problems of population; theories of popu-  
lation growth and decline. Holt.

**Soc. 106 s. Regional Sociology (3)**—Two lectures, one discussion. Prerequisite, Soc. 3 f and 4 s. Each student will be required to prepare a term paper.

An analysis of American society in terms of regional factors and their impact upon social institutions. Problems to be covered will include: the meanings and implications of regionalism; criteria of regional differentiation; types of regions in the United States; problems peculiar to these regions; metropolitan, rural, cultural, and administrative regionalism; regional planning and development. Hodge.

**Soc. 107 f. Ethnic Minority Groups (2)**—Two lectures. Prerequisite, Soc. 3 f and 4 s or consent of instructor.

Theoretical aspects of ethnic group relations; cultural backgrounds of immigrant groups in America; social processes and class structure with reference to certain minority peoples; effects of cultural contacts upon personality. Wilson.

**Soc. 108 s. Marriage and the Family (3)**—Two lectures, one discussion. Prerequisite, Soc. 3 f or consent of instructor.

The family as an institution; variations of the family in time and space; family interaction: courtship and mating behavior, marital behavior, parent-child behavior, member roles and personality; family tensions and maladjustments: structural and functional factors, conflict patterns, divorce and desertion; family and society; family adjustment and social change. Wilson.

**Soc. 109 s. Comparative Sociology (2)**—Two lectures. Prerequisite, Soc. 3 f and 4 s.

A comparative analysis of the basic institutions of primitive and civilized societies; resemblances and differences in patterns of material and non-material culture; contrasting types of social organization and member roles; the origin, diffusion, and change of traits and complexes; significance of findings for sociological generalization. Wilson.

**Soc. 120 f. Social Pathology (3)**—Two lectures and one field trip. Prerequisite, Soc. 3 f and 4 s, or consent of instructor.

A study of social maladjustments which represent deviations from generally accepted norms. Problems to be covered will include: poverty, unemployment, family disorganization, crime and delinquency, suicide, and the misuse of leisure time. Hodge.

**Soc. 121 f. Criminology (3)**—Two lectures, one discussion. Prerequisite, Soc. 3 f and 4 s or consent of instructor.

The social significance of crime; causative factors; forms and processes of criminal behavior; detection, apprehension, and prosecution methods; penology and treatment; public policy and crime prevention. Wilson.

**Soc. 123 f. The Sociology of Leisure (3)**—Two lectures, one discussion. Prerequisite, Soc. 120 f or consent of instructor.

This course deals primarily with the sociological implications of leisure time and its uses. Topics to be considered will include: the meaning and significance of leisure; the conditioning factors of leisure time and its uses; the changing uses of leisure; leisure and personality; theories of play and recreation; commercial, public, and voluntary forms of recreation; planning of leisure time activities. Hodge.

**Soc. 124 s. Introduction to Social Work (3)**—Two lectures and one field trip. Prerequisite, Soc. 120 f.

The theory of social work; social case work, generic and specific; procedure and techniques in social case work; principles of social diagnosis; present day types of social work; administration of public and private welfare agencies. Joslyn.

**Soc. 130 f. Recent Social Thought (3)**—Two lectures, one discussion. Prerequisite, Soc. 3 f and 4 s. Required of all sociology majors.

A general survey and critical study of the leading schools of sociological thought since 1800. Wilson.

**Soc. 131 f. Techniques of Investigation in Sociology (3)**—Three periods of practice and discussion. Prerequisite, Soc. 3 f and 4 s.

A study of quantitative methods in sociology and actual practice in various methods of obtaining, analyzing, and interpreting data. Holt.

**Soc. 150 s. Field Practice in Social Work (3).** Prerequisite, Soc. 124 s or consent of instructor. Enrollment restricted to available opportunities.

Supervised field work of various types undertaken during the summer months and suited to the needs of the individual student. Joslyn.

#### COURSES FOR GRADUATES

**Soc. 200 y. Seminar in Methodology (6)**—Three periods of discussion. Required of all graduate students in sociology.

A study of fundamental methodological problems in sociology. Among the subjects to be considered will be: language problems in scientific discourse; operational concepts in sociology; the postulates, procedures, and methods of science; the uses and limitations of quantitative methods; the sociology of knowledge; controversial issues in sociology; techniques of investigation. Staff.

**Soc. 201 f. Seminar in Systematic Sociology (3)**—Three periods of discussion. Required of all graduate students in sociology.

A study of social systems and the processes by which these systems maintain an equilibrium between external and internal forces. Joslyn.

**Soc. 202 s. Sociological Theory (3)**—Two lectures, one discussion. Required of all graduate students in sociology.

An analysis and evaluation of the works of outstanding theorists in Europe and America. Special attention will be given to Simmel, Vierkandt, Von Wiese, Tonnies, Weber, Durkheim, Pareto, Thomas, and Sorokin. Wilson.

**Soc. 203 s. Comparative Sociology (3)**—Two lectures, one discussion.

A study of certain aspects of the process of personality organization and disorganization in the framework of selected primitive societies as compared with contemporary American society. Wilson.

**Soc. 204 s. Community Organization (3)**—Two lectures, one discussion.

Criteria of community organization and disorganization; variables in community organization and their conditioning factors; special problems in the organization of rural, village, suburban, and urban communities; community stability and instability; the lay and professional leader in the community. Classroom and field studies will be made of the composition, structure, and functioning of selected communities. Dodson.

**Soc. 205 f. Rural-Urban Sociology (3)**—Two lectures, one discussion.

A study of the differences between rural and urban societies with reference to composition of population, social mobility, social relationships, differentiation of social groups, standards of living, mores and attitudes, and various pathological conditions. Holt.

**Soc. 206 s. Regional Sociology (3)**—Two lectures, one discussion.

A comparative analysis of regional trends in the United States and various foreign countries. Topics to be covered will include: the meanings and implications of regionalism; historical origins of regionalism; demarcation of regions in the United States on the basis of geographic, economic, demographic, political, and cultural criteria; characteristics and problems peculiar to each region; the role of local, state, and national administrative units in regional planning and development. Hodge.

**Soc. 207 s. Population Problems (3)**—Two lectures, one discussion.

An intensive study of selected problems in the fields of population growth, fertility and mortality, population composition, and population migration. Holt.

**Soc. 208 s. Occupational Sociology (3)**—Two lectures, one discussion.

Structure and function of the social division of labor; typologies of occupational organization; major bases of differentiation; criteria of a profession; the role of professionalism in social organization; a methodology for analyzing the professions; sociological study of selected professions. Wilson.

**Soc. 209 f. Social Organization (3)**—Two lectures, one discussion.

A study of the forms of organization common to basic social institutions; classification of these forms; variations of forms of organization in time and space; conditioning factors of organizational forms; application of findings to contemporary problems. Joslyn.

**Soc. 210 f. The Sociology of Leadership (3)**—Two lectures, one discussion.

An analysis of the leader-follower relationship; leadership defined; factors conditioning the leadership situation; leadership as a function of the group; the leader as an instrument of social control; methods of developing group support; the professional and lay leader; functions of the leader; types of leaders; morale as a function of leadership. Dodson.

**Soc. 221 f. Criminology (3)**—Two lectures, one discussion.

A study of the principal theoretical problems of criminological investigation, with emphasis upon a methodological analysis of selected monographs. Wilson.

**Soc. 250. Research in Sociology**—Credit apportioned to work accomplished.

Individual research projects involving either field work or analysis of compiled data. Staff.

## ZOOLOGY

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Zool. 101 s. Mammalian Anatomy (3)**—Three laboratories. Registration limited. Permission of the instructor must be obtained before registration.

A course in the dissection of the cat or other mammal. By special permission of the instructor a vertebrate other than the cat may be used for study. Phillips.

**Zool. 102 s. Histological Technique (3)**—One lecture; two laboratories. Registration is limited and the permission of the instructor must be obtained before registration.

The preparation of animal tissues for microscopical examination. The course is designed to qualify the student in the preparation of tissues and blood for normal and pathological study. Hard.

**Zool. 103 y. General Animal Physiology (6)**—Two lectures; one laboratory. Prerequisites, one year of chemistry and one course in vertebrate anatomy. Registration limited to twelve, and permission of instructor must be obtained before registration.

The first semester work deals with the fundamentals of cellular and general physiology. The second semester is devoted to an application of these principles to the higher animals. Phillips.

**Zool. 104 f. Genetics (3)**—Three lectures.

A general course designed to give an insight into the principles of genetics, or of heredity; a consideration of the factors instrumental in the transmission of characters through successive generations. A course to prepare students for advanced courses in the breeding of animals and plants. Burhoe.



**Zool. 105 f. Aquiculture (3)**—Two lectures; one laboratory. Prerequisite, one course in zoology.

The course deals with the practices employed in rearing aquatic animals and the properties of natural waters which render them suitable for environmental purposes. Truitt.

**Zool. 120 s. Advanced Genetics (3)**—One lecture, two laboratories. Prerequisite, Zool. 104 f.

A consideration of salivary chromosomes, the nature of the gene, chromosome irregularities, polyploidy, and mutations. Breeding experiments with *Drosophila* and small mammals will be conducted. Burhoe.

**Zool. 121 f. Principles of Animal Ecology (3)**—Two lectures; one laboratory. Prerequisite, one course in zoology.

Animals are studied in relation to their natural surroundings. Biological, physical, and chemical factors of the environment which affect the growth, behavior, habits, and distribution of animals are stressed in lecture and laboratory. The use of ecological instruments is studied in the laboratory and on field excursions to local areas of special interest. The course is designed to give a broad survey of the field of ecology and to offer a background for students who wish to continue with some special problem in the field. Tressler.

#### COURSES FOR GRADUATES

**Zool. 200 f. Marine Zoology (4)**—Two lectures; two laboratories.

Problems in salt water animal life of the higher phyla. Truitt.

**Zool. 201 s. Microscopical Anatomy (4)**—Two lectures; two laboratories.

A detailed study of the morphology and activity of cells composing animal tissues. Recent advances in the field of cytology are covered in lectures, assigned readings, and reports. Hard.

**Zool. 203 s. Advanced Embryology (4)**—Two lectures; two laboratories.

Mechanics of fertilization and growth. A review of the important contributions in the field of experimental embryology and development of animals, including a consideration of tissue culture and transplantation. Burhoe.

**Zool. 204 f. Advanced Animal Physiology (4)**—Two lectures; two laboratories.

The principles of general and cellular physiology as found in animal life. Phillips.

**Zool. 205 s. Hydrobiology (4)**—Two lectures; two laboratories.

A study of the biological, chemical and physical factors which determine the growth, distribution and productivity of microscopic and near microscopic organisms in marine and freshwater environments, with special

reference to the Chesapeake Bay region. Microscopic examination and identification of plankton, and experience with hydrobiological equipment and methods, is provided for in the laboratory and field. Tressler.

Zool. 206. Research. Credit to be arranged. Staff.

Zool. 207 y. Zoological Seminar (2). Staff.

### CHESAPEAKE BIOLOGICAL LABORATORY

This laboratory, located in the center of the Chesapeake Bay country, is on Solomons Island, Maryland. It is sponsored by the University of Maryland in cooperation with the Maryland Conservation Department, Goucher College, Washington College, Johns Hopkins University, Western Maryland College, and the Carnegie Institution of Washington, in order to afford a center for wild life research and study where facts tending toward a fuller appreciation of nature may be gathered and disseminated. The program projects a comprehensive survey of the biota of the Chesapeake region.

The laboratory is open throughout the year. Courses are offered for advanced undergraduate and graduate students, during a six-week summer session, in the following subjects: Economic Zoology, Protozoology Invertebrates, Ichthyology, Algae, and Diatoms. Not more than two courses may be taken by a student, who must meet the requirements of the Department of Zoology as well as those of the laboratory before matriculation. Classes are limited to eight matriculants. Students pursuing special research may establish residence for the summer, or for the entire year.

Laboratory facilities; boats of various types fully equipped with pumps, nets, dredges and other apparatus; and shallow water collecting devices are available for the work without cost to the students.

For further information about work at the Chesapeake Biological Laboratory, apply to Dr. R. V. Truitt, Director, College Park, Maryland.

## GRADUATE COURSES IN THE PROFESSIONAL SCHOOLS AT BALTIMORE

### SCHOOL OF MEDICINE

#### ANATOMY

##### Minors

The courses recorded under "Minors" are acceptable as graduate courses only if they are taken to satisfy minor requirements in a major subject.

**Anat. 101 f. Human Gross Anatomy (10)**—Total number of hours, 288. Five lectures; fifteen laboratory hours per week throughout the first semester.

A complete dissection of the human body (exclusive of the central nervous system).

Uhlenhuth, Figge, Plagge, Covington, Brantigan, Teitelbaum.

**Anat. 102 f. Mammalian Histology (6)**—Two lectures; ten laboratory hours per week.

A general survey of the histological structure of the organs of mammals and man. Opportunity is offered for examining and studying a complete collection of microscopical sections.

Davis, Lutz, Harne.

**Anat. 103 s. Human Neurology (4)**—Three lectures and six laboratory hours per week for ten weeks of the second semester. Prerequisite, Anat. 102 or equivalent.

This course provides a general survey of the structure of the human central nervous system, being mainly directed toward the fiber tracts and nuclei contained therein. It includes a brief study of the special senses. The laboratory work is based on a dissection of the human brain, together with the study of prepared microscopic sections of the brain stem.

Davis, Lutz, Harne.

##### Majors

**Anat. 202. Research.** Credit in accordance with the amount of work done.

Work may be in the field of Embryology, or of Histology. Open to students majoring in Anatomy.

Davis, Harne.

Courses 203, 204 and 205 are offered throughout the year, including the summer time. Time and credit are adjusted in personal conference between student and instructor.

**Anat. 203. Advanced Gross Anatomy.** Number of hours by arrangement.

The study of human anatomy by gross anatomical methods, especially by dissection of specialized structures and limited regions of the human body. The exact nature of this course will depend on the requirements of the applicant. It may be taken by students of anatomy, medicine and biology as well as by physicians desiring graduate work.

Uhlhenhuth, Figge, Plagge, Brantigan.

**Anat. 204. Experimental Anatomy of the Endocrine Glands.**

This course is intended to impart broad familiarity with the subject and to provide, through the medium of laboratory work, a knowledge of the methods of its investigation. Intimate contact with the instructor, frequent informal discussions and properly selected reading take the place of formal lectures.

Uhlenhuth.

**Anat. 205. Problems in the Experimental Anatomy of the Endocrines.**

This course is a continuation of the previous one, but on an advanced level. It may be used for the preparation of a thesis leading to a Ph.D. degree.

Uhlenhuth.

## BACTERIOLOGY

### Minors

**Bact. 101 f. General Bacteriology (5).** Sixteen lectures and 104 laboratory hours.

The course includes the preparation and sterilization of culture media and the study of pathogenic bacteria and the more important protozoa. The principles of general bacteriology are discussed in lectures.

**Bact. 102 s. Immunology (4)**—Sixteen lectures and 56 laboratory hours.

Principles of immunology are discussed in the lectures. Experiments to demonstrate the action of various antibodies are performed by the students.

### Majors

**Bact. 201. Special Problems.** Time and credit are subject to special arrangement. A laboratory course on selected problems of bacteriology. The lectures are supplemented by personal contact with the instructor, discussions of the various phases of the work and by reading.

**Bact. 202. Research.** Time and credit are subject to special arrangement.

## BIOCHEMISTRY

### Minors

**Biochem. 101 s. Principles of Biochemistry (8)**—Seven lectures and conferences, and two three-hour laboratory periods per week for sixteen weeks, from February to May, inclusive. Prerequisites, Chem. 1 A and B y, Chem. 8 A and B y, Chem. 103 A and B y.

This course is designed to present the principles of biological chemistry and to indicate their applications to the clinical aspects of medicine. The phenomena of living matter and its chief ingredients, secretions and excretions, are discussed in lectures and conferences and examined experimentally. Training is given in routine biochemical methods of investigation. This course is a prerequisite to advanced work in this subject. Graduate students who take this course as a minor toward a higher degree are required to supplement it by extra-curricular work.

Wylie, Schmidt, Ogden.

### Majors

**Biochem. 201 f and s.** A course in specialized fields of biochemistry designed to prepare the student for advanced research work. Prerequisite, Biochem. 101 s. The particular phases of biochemistry taken up in this course will vary with the requirements and interests of the student. The course is limited to students working toward a Ph.D. degree in biochemistry and in other biological subjects. Credit is allotted in keeping with the extent and quality of work accomplished.

Wylie, Schmidt.

**Biochem. 202. Research.** Limited to graduate students seeking a Ph.D. degree in biochemistry. Credit is given on the basis of extent and quality of accomplishment.

Wylie, Schmidt.

## PHARMACOLOGY

All students majoring in pharmacology with a view to obtaining the degree of Master of Science or Doctor of Philosophy should secure special training in anatomy, mammalian physiology, organic chemistry, and physical chemistry (Chem. 102 A y).

### Minors

**Pharmacology 101 f and s. General Pharmacology (7)**—Three lectures; one laboratory. This course consists of 90 lectures and 30 laboratory periods of three hours each; offered each year, September to May inclusive, at the Medical School.

Pharmacology as applied to medicine and the fundamental principles of pharmacologic technique are taught in this course, hence it is a prerequisite for all other advanced courses in this subject.

Krantz, Carr, Evans, Musser, Harne, Johnson.

### Majors

**Pharmacology 202 f. Chemotherapy.** Credit in accordance with the amount of work accomplished.

The action of new synthetic compounds from a pharmacodynamic point of view.

Krantz.



**Pharmacology 203 f. Carbohydrate Metabolism.** Credit in accordance with the amount of work accomplished.

A systematic study of the relationship between chemical constitution and the fate of carbohydrates and carbohydrate-like substances in the animal body.  
Krantz, Carr.

**Pharmacology 204 f. Research.** Credit in accordance with the amount of work accomplished.

Properly guided research problems in pharmacology and related fields. Open to students majoring in pharmacology.  
Krantz, Carr.

**Pharmacology 205 f. Research.** Credit in accordance with the amount of work accomplished.

Special problems in toxicology, the detections of poisons in viscera, and industrial poisons.  
Evans.

## PHYSIOLOGY

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Physiology 101. The Principles of Physiology (8)**—Four lectures, two conferences, and two laboratory periods a week, supplemented by demonstrations. September to January, inclusive.

The fundamental concepts of physiology are presented in lectures and illustrated by laboratory experiments. Attention is given especially to those phases of physiology which are essential for a medical training.

Amberson and staff.

### COURSES FOR GRADUATES

**Physiology 201. Experimental Mammalian Physiology.** Time and credit by arrangement.

Open to properly qualified graduate students. The work will consist of selected experiments and discussions involving the original literature.

Amberson, Smith, Oster, Toman.

**Physiology 202. Water and Electrolyte Balance in the Vertebrate Body (1)**—One lecture a week, February to May, inclusive.

Review of recent work dealing with the electrolytes of blood and tissues, with the associated distribution of water, and with the role of the kidney in water and electrolyte regulation.

Amberson.

**Physiology 203. Humoral Control of Physiological Function (1)**—One lecture a week, February to May, inclusive.

Discussion of recent advances in our knowledge of the chemical control of various bodily activities, with particular emphasis on the physiology of the endocrine glands and the vitamins.

Smith.

**Physiology 204. Electrophysiology (1)**—One lecture a week, February to May, inclusive.

Discussion of recent developments in electrophysiology. Oster, Toman.

**Physiology 205. Seminar.** Credit according to work done.

Intensive study of the literature in selected fields of physiology as preparation for research. Amberson and staff.

**Physiology 206. Research.** By arrangement with the head of the department. Staff.

## SCHOOL OF PHARMACY

### BACTERIOLOGY

**201 f. Chemotherapy (1)**—One lecture. (Given in alternate years.)

A study of the chemistry, toxicity, pharmacology and therapeutic value of drugs employed in the treatment of parasitic diseases. Grubb.

**202 s. Immuno-chemistry (1)**—One lecture. (Given in alternate years.)

A study of the chemical nature of antigens, antibodies and the antibody-antigen reactions. Grubb.

**203 f, 204 s. Special Problems in Bacteriology.**

A laboratory course on selected problems in bacteriology including library reading and conferences with the instructor. Credit determined by amount and quality of work performed. Grubb.

### BOTANY

#### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**101 y. Taxonomy of the Higher Plants (2)**—One lecture; one laboratory. (Given in alternate years.)

A study of the kinds of seed plants and ferns, their classifications, and field work on local flora. Emphasis will be placed on official drug plants. Instruction will be given in the preparation of an herbarium. Slama.

**102 y. Plant Anatomy (8)**—Two lectures; two laboratories.

Lectures and laboratory work covering advanced plant anatomy with special emphasis placed on the structures of roots, stems and leaves of vascular plants. Slama.

#### COURSES FOR GRADUATES

**201 y. Advanced Study of Vegetable Powders (4-8)**—Two lectures; two laboratories. (Given in alternate years.)

A study of powdered vegetable drugs and spices from the structural and micro-chemical standpoints, including practice in identification and detection of adulterants. Slama.

**Bot. 202 y. Advanced Pharmacognosy (4-8)**—Two lectures; two laboratories.

A study of many crude drugs not ordinarily studied in other pharmacognosy courses. Special attention will be given to practical problems and to the identification and detection of adulterants. Slama.

**Bot. 203. Research in Pharmacognosy.** Credit according to amount and quality of work performed.

## PHARMACEUTICAL CHEMISTRY

## COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Chem. 102 A y. Physical Chemistry (6)**—Three lectures. Prerequisites, Chem. 2 y and 4 f, and Phys. 1 y.

This course aims to furnish the student with a thorough background in the theories and laws of chemistry. The gas laws, kinetic theory, liquids, solutions, elementary thermodynamics, thermochemistry, equilibrium, chemical kinetics, etc., will be discussed. Vanden Bosche.

**Chem. 102 B y. Physical Chemistry (2-4)**—One or two laboratories. Prerequisite, Chem. 102 A y, or may be taken simultaneously with 102 A y.

This course consists of quantitative experiments designed to demonstrate physico-chemical principles, illustrate practical applications and acquaint the student with precision apparatus. Vanden Bosche.

**Pharm. Chem. 103 y. Physiological Chemistry (8)**—Two lectures, two laboratories. Prerequisites, Chem. 1 y, 2 y, 4 s, Physiol. 1 s.

General survey of the subject, including study of digestion, metabolism, excretion, enzymes, hormones, vitamins, and other topics of pharmaceutical interest. Chapman, Gittinger, McNamara.

**Pharm. Chem. 110 y. Chemistry of Medicinal Products (4)**—Three lectures. Prerequisite, Chem. 2 y.

A survey of the structural relationships, syntheses and chemical properties of important medicinal products. Hartung et al.

**Pharm. Chem. 111 y. Laboratory Exercises in Chemistry of Medicinal Products (1-4)**—Two laboratories. Prerequisite, Pharm. Chem. 110 y; or may be taken simultaneously with Pharm. Chem. 110 y.

Laboratory exercises dealing with important and characteristic chemical properties of pharmaceutical and medicinal products. Hartung et al.

**Chem. 117 y. Organic Laboratory (2)**—One laboratory. Prerequisite, Pharm. Chem. 111 y.

A course devoted to an elementary study of organic qualitative analysis. This work includes the identification of unknown organic compounds. Starkey.

**Chem. 118 y. Advanced Organic Laboratory (2)**—One laboratory. Prerequisite, Pharm. Chem. 111 y.

A study of organic quantitative analysis and the preparation of organic compounds. Quantitative determinations of carbon and hydrogen, nitrogen and halogens are carried out, and representative syntheses, more difficult than those of Chem. 2 y, are studied. Starkey.

## COURSES FOR GRADUATES

**Pharm. Chem. 200 y. Survey of Pharmaceutical Chemistry (4).** Prerequisite, Pharm. Chem. 110 y and 111 y, or equivalent.

A survey of the chemical structure and reactions of selected groups of pharmaceutically and pharmacologically important compounds of non-basic nature. Hartung, Starkey.

**Pharm. Chem. 201 y. Chemistry of Alkaloids (4)**—Two lectures.

A survey of the chemical structure and the reactions of pharmaceutically and pharmacologically important organic bases. Hartung.

**Pharm. Chem. 202 y. Advanced Pharmaceutical Synthesis (1-8)**—Laboratory work and conferences.

A study of fundamental and basic chemical procedures employed in the synthesis of various drugs and their intermediates, and a survey of their application. Hartung.

**Pharm. Chem. 203 y. Pharmaceutical Chemistry Seminar (2).**

Reports of progress and discussion of the problems encountered in research and the presentation of papers which survey the recent developments of pharmaceutical chemistry reported in the current literature. Required of all students majoring in the department throughout their period of matriculation. Hartung.

**Pharm. Chem. 204 y. Advanced Pharmaceutical Analysis (1-4).** Prerequisites, Chem. 117 y and 118 y.

A laboratory study of the analytical procedures and methods as applied to official and commercial, natural and synthetic drugs, their intermediates and derivatives. Hartung.

**Pharm. Chem. 205. Research in Pharmaceutical Chemistry.** Credit to be determined by the amount and quality of work performed. Hartung.

## PHARMACOLOGY

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Pharmacology 110 f. Official Methods of Biological Assay (4)**—Two lectures, two laboratories. Prerequisite, Physiology 1 f and Pharmacology 1 y.

A course in the methods of biological assay prescribed by the United States Pharmacopoeia and the National Formulary. Chapman.

### COURSES FOR GRADUATES

**Pharmacology 201 y. Methods of Biological Assay (8)**—Two lectures; two laboratories. Prerequisite, Pharmacology 110 f. (Given in alternate years.)

The application of statistical methods to the problems of biological assay and a study of the more important unofficial methods for the assay of therapeutic substances. Chapman.



**Pharmacology 202 y. Special Studies in Pharmacodynamics (4-8)**—Two lectures; two laboratories. Prerequisite, Pharmacology 1 y. (Given in alternate years.)

The procedures involved in pharmacological analysis and in the determination of the site of action and the nature of action of drugs. Chapman.

**Pharmacology 203 y. Special Studies in Biological Assay Methods (4-8)**—Laboratory work and conferences. Prerequisite, Pharmacology 110 f, Pharmacology 201 y.

The development of biological assay methods and comparative standards for substances for which there are no satisfactory methods or standards. Chapman.

**Pharmacology 204. Research in Pharmacology and Therapeutics.** Credit according to amount and quality of work performed. Chapman.

## PHARMACY

### COURSES FOR GRADUATES AND ADVANCED UNDERGRADUATES

**Pharmacy 101 y. (6)**—One lecture; two laboratories. Prerequisite, consent of the instructor.

A continuation of the courses given in the Pharmacy School in the second and third years with special reference to methods employed in the manufacture of pharmaceuticals on a commercial scale. DuMez, Andrews.

### COURSES FOR GRADUATES

**Pharmacy 201 y. Advanced Pharmaceutical Technology (8)**—Two lectures; two laboratories.

A study of pharmaceutical manufacturing processes from the standpoint of plants, crude materials used, their collection, preservation, and transformation into forms suitable for therapeutic use. DuMez, Andrews.

**Pharmacy 202 y. Survey of Pharmaceutical Literature (2)**—One lecture. (Given in alternate years.)

Lectures and topics on the literature pertaining to pharmacy with special reference to the origin and development of the works on drug standards; pharmaceutical periodicals. DuMez.

**Pharmacy 203 y. History of Pharmacy (4)**—Two lectures. (Given in alternate years.)

Lectures and topics on the development of pharmacy in America and in the principal countries of Europe. DuMez.

**Pharmacy 204. Research in Pharmacy.** Credit and hours to be arranged. DuMez.

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